a guide to the

care of bare-nosed wombats

version 3.1

care guide by linda dennis

veterinary guide by kim rolls and anne fowler

naturopathic guide by anne-marie dineen

"*Share your knowledge. It is a way to achieve immortality.*"
Dalai Lama

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a guide to the

care of bare-nosed wombats

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Bare-Nosed Wombat
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a note from Fauna First Aid

I would like to send huge thanks to Shirley Lack and Kim Rolls who generously agreed to help present the inaugural **care of bare-nosed wombats** course in November 2005, which helped get this lecture program off the ground.

Huge thanks to Kim Rolls and Anne Fowler who kindly agreed to write **the veterinary guide** and for all their advice and support over the years. And to Anne-Marie Dineen, I give many thanks for sharing her knowledge in **the naturopathic guide** - giving the wildlife community even more options for the quality care of Bare-Nosed Wombats - and Australian wildlife in general.

Thanks to my much valued vets - Judith Carney (Summer Street Veterinary Centre), Kim Rolls (Orange Veterinary Hospital) and Sarah Butler (North Hill Veterinary Hospital) who have all helped me enormously with advice and discounted services over the years. Huge thanks also to Benn Bryant of Dubbo's Veterinary and Quarantine Centre at Western Plains Zoo and Tim Portas of Australia Zoo who have both offered consultations, medications and advice free of charge.

The care guide component of this manual has been written from personal experience while caring for Bare-Nosed Wombats as well as other Australian marsupials. My experience has been learnt due to the many individuals in the wildlife community who have been willing to share care information with me and from the many exceptional wildlife care guides that are made available to carers. I would like to take this opportunity to thank all those who have offered much valued advice and support throughout the years and those who have selflessly written guides on the care of native animals so that people - like me - can learn more.

Many thanks to the following individuals and organisations for allowing me the use of their wombat photos for this guide; Carol Pullar, Sandra Stewart, Cara Lee, Shirley Lack, Marg Larner, Lorraine Bell, Sarah Trembath, Michele Barnes of Dreamworld in Queensland, Western Plains Zoo, Australian Museum Online, Museum Victoria, University of Edinburgh, Anne-Marie Dineen, Port Macquarie Koala Hospital, Naracoorte Caves, Terri Eather Kay Muddiman, Stephanie Clarke, Wayne White, Helen Taylor and Robbie Taylor.

Special thanks to Alan Horsup of Queensland Parks and Wildlife Service for allowing me to use photos of the critically endangered Northern Hairy-Nosed Wombat. I am exceptionally honoured to be given permission to use these very special photos.

A big hug to my sister, Fiona Saxton, who proof read the guide and corrected the 7 million grammatical errors in the guide!

Enormous gratitude and appreciation to:

- **Digital Pacific** for sponsoring my website www.fourthcrossingwildlife.com .
- the **Australian Geographic Society** for supporting my **Fauna First Aid** wildlife lecture program.
- the **Australian Wildlife Society** (formerly the Wildlife Preservation Society of Australia) for recognising my wildlife education work and awarding me the **2006 Serventy Conservation Medal Runner Up** and for their continued support of my wildlife work.
- the **International Fund for Animal Welfare** for also recognising my work and awarding me the **2007 Animal Welfare and Education Award**.

And of course, massive thanks to my wonderful husband Todd, who has dealt admirably with my wildlife obsession…… and the crap that often goes with it.

Kind regards,

Linda Dennis
Fauna First Aid
Fourth Crossing Wildlife
www.fourthcrossingwildlife.com

dedicated to the conservation of Australian native animals....

Linda Dennis, course organiser, presenter and author of **the care guide**, can be contacted at linda@fourthcrossingwildlife.com or on 0416 014 466.

Kim Rolls, co-author of **the veterinary guide**, can be contacted at Orange Veterinary Hospital (02) 6361 8388. The vet hospital is located on Molong Road in Orange.

Anne Fowler, co-author of **the veterinary guide** can be contacted at PO Box 1423, Healsville VIC 3775. Phone contact for Anne is 0409 503 379.

Anne-Marie Dineen, author of **the naturopathic guide** can be contacted on (07) 5484 7354 or by email at anmacropod@bigpond.com. Anne-Marie's clinic is located at 389 Cogzell Road, Oakview QLD 4600 (near Kilkivan).

Disclaimer

This manual and accompanying course are designed to provide an overview of the care of Bare-Nosed Wombats. While every effort has been taken to include the complete data required to care for or raise Bare-Nosed Wombats, the authors and course presenters will not accept responsibility or liability for any error, omission or reliance upon the information or advice given.

Each state and territory have different requirements for caring for wildlife, and most states require that a carer is licensed. While the course and this manual have provided the information to care for wombats, those wishing to care for them are responsible to see that they are appropriately licensed (if applicable).

Any involvement in caring for wildlife is done entirely at your own risk. The authors and course presenters accept no liability for injuries or difficulties arising from your involvement.

Remember!

Learning does not stop with this guide and accompanying course. You are encouraged to seek further advice and attend more courses to continually broaden your knowledge. You are also encouraged to build a support network across barriers such as regions and individual wildlife organisations. There is a page at the end of this guide where you can record contact details of people who have attended this course, as well as others you may already know.

And please, share your knowledge - our precious Aussie critters can only benefit from it!

A Guide to the Care of Bare-Nosed Wombats
Version 3.1
2017

introduction

linda dennis…

(1)

My passion for Australian native animals was kick started more then 20 years ago with my very first raptor experience at Eagle Heritage near Margaret River in Western Australia. After an up close and personal experience with a Black Kite perching on my gloved hand I vowed that I would soon work closely with these magnificent creatures.

Some years later I held true to the vow and I become licensed to raise and rehabilitate native animals that had been injured, were sick or orphaned. And, with the help of my husband Todd, I have now been experiencing the joy of wildlife care for nearly 20 years.

I have cared for many Australian native animals including several species of macropod and possum, various reptiles and many species of bird including my beloved Birds of Prey, in which I specialised in for nearly 3 years. I had the immense pleasure of successfully rehabilitating and releasing many Birds of Prey including the awesome Wedge-Tailed Eagle, Nankeen Kestrel, Collared Sparrowhawk, Peregrine Falcon, Black-Shouldered Kite and more.

For many years I have had the enormous delight of raising Bare-Nosed Wombats. These short and stocky bundles of energy and bravado became my ultimate passion in life! Our first wombat Tici - with very little effort - took over a large part of my heart and I have been hooked on wombats ever since.

In 2004 I recognised that there was a gaping hole in my region in wildlife carer and public education relating to Australian wildlife and so I established **Fauna First Aid**. The programs début was to teach vet nurse students at Orange TAFE how to properly care for native animals in a veterinary care situation. The lectures have also been presented at Bathurst TAFE and I have been asked to teach at Dubbo, Mudgee and surrounding areas.

In 2005 I extended the program to include school age students - highlighting the dangers involved in handling wild animals and to show what Mum & Dad could do to rescue a native animal and to provide short term care. A community program has also been included in the lecture series teaching rescue, proper handling technique and short term care.

In June 2005 **Fauna First Aid** became a project sponsored by the **Australian Geographic Society** – a very humbling and proud moment. With such high profile backing I decided to take the plunge and move my wildlife seminars to the next level and so became **a guide to the care of bare-nosed wombats**.

kim rolls…

(2)

Kim Rolls is currently a veterinarian in general practice at Orange Veterinary Hospital.

A graduate of Sydney University he has practiced in Sydney, Narromine & Egham in England. As well as general practice Kim spent a number of years running lamb and cattle feedlots, advising on nutrition and formulating rations for a feed mill and managing an Angus Stud.

Kim's interest in Australian wildlife stems from a childhood in country NSW and especially the years spent living beside the Pilliga Scrub at Baradine, helping in research for the books of his father, Eric Rolls.

Kim is co-author of **the veterinary guide**.

Written by Kim Webster.

anne fowler…

(3)

Anne Fowler graduated from Veterinary Science at Sydney University after completing an Honours year investigating Vitamin D Metabolism in Marsupials.

She then worked as a veterinarian in the Hunter Valley where she became involved with wildlife through Native Animal Trust Fund.

When Anne moved to Victoria, she obtained a wildlife shelter permit and began teaching about wildlife care to foster carers and shelters. Anne teaches on wildlife care to carer groups throughout Australia while working as a veterinarian with an interest in birds, pocket pets and wildlife.

Anne is co-author of **the veterinary guide**.

anne-marie dineen…

(4)

I qualified as a Herbalist in 1990 and completed an advanced diploma in health science Naturopathy in 2000. In 2002 after rescuing several injured animals I decided to learn more about wildlife and joined a local wildlife organisation.

After attending several workshops I began caring for possums and soon progressed to birds and macropods. When I began caring for an Eastern Grey Kangaroo joey with thrush it was second nature for me to devise a herbal formula to treat him. He responded extremely well to treatment and over the next few years my herbal thrush formula was requested by many fellow carers who used it with similar success.

Since then I have devised several herbal formulas, ointments, creams, homeopathic and nutritional remedies.

I send my remedies all over the country and my naturopathic business has more animal clients now than human!.

At present I am caring for macropods and have the luxury of living on 300 acres which is suitable for release for a wide variety of animals

Anne-Marie is the author of **the naturopathic guide**.

Graphics List.

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Photo by Todd Dennis

linda dennis

foreword

Whereas there have been many guides produced on the care of other marsupials, such as kangaroos, there has been a noticeable lack of detailed guides on the care of wombats.

Linda Dennis has put together another excellent on-line resource in "A Guide to the Care of Bare-Nosed Wombats" to fill the gap. The provision of good-quality information to wildlife carers is essential in improving the level of handrearing and rehabilitation amongst wildlife carers, and this guide is important as a valuable tool for carers rearing juvenile wombats and treating adult wombats.

It appears that once you have cared for one wombat, every carer then seems to enter a life-long love affair with this cheeky, endearing species.

The information in this guide is easily absorbed and well-laid out. The index makes it easy to go to the information you need – when you need it urgently. The photos illustrate the conditions well and capture the character of the wombat. It is a tribute to the network that Linda has, to see the contributions that other wombat carers have made through their photos and sharing of their knowledge. Such an approach means that we all learn, and Linda has demonstrated in this updated version, that our knowledge of this species continues to grow. The information on how to live with wombats is a helpful tool for the carer talking to a member of the community, and the case studies highlight the highs and lows of caring for wildlife: the animals that share our lives for a short time and make us cry with joy and sadness.

I hope that you enjoy reading this manual as I did, and hope that you too, will find those gems of information that help you to understand the wombat more thoroughly.

Dr Anne Fowler
BVSc, MACVSc (Avian Health)

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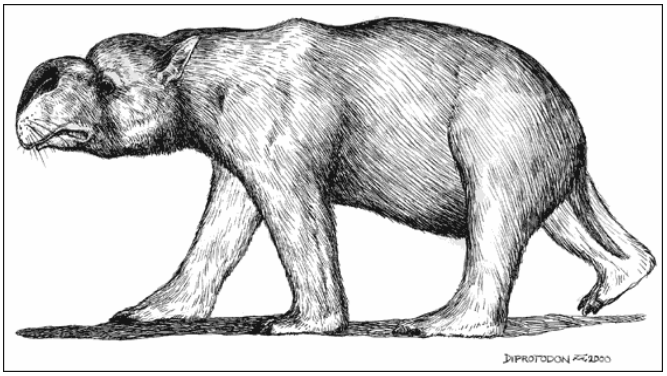
brief history

Tambar Springs – Diprotodon Country! (1)
© Linda Dennis

The wombat descends from an ancient line of animal, the *Diprotodon.* Large herbivorous marsupials, Diprotodon (of which there were numerous species) walked the earth between 15 million years and 15 thousand years ago.

In Australia during the Pleistocene Ice Age period (a time spanning 2 million years) numerous giant like animals known as "*megafauna"* existed including several species of giant kangaroo, the marsupial lion *Thylacoleo carnifex* and *Diprotodon opatum*.

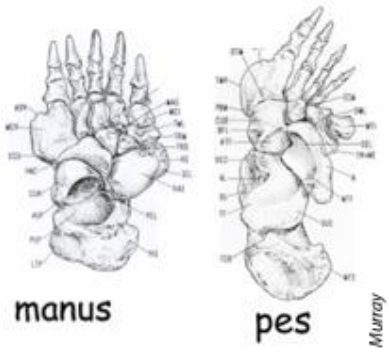


Diprotodon (2)
© Museum Victoria

Diprotodon was the largest of them all, measuring around 2 metres high at the shoulders and approximately 3 metres in length and weighing approximately 1.5 - 2.5 tonnes.

The wombat and the Diprotodon share many similarities; including:

- **a backward facing pouch**.
- **a herbivorous diet**.
- **the tooth construction** of both animals are very similar. The wombat prefers tough native grasses and to combat tooth erosion its teeth grow continuously throughout life. The Diprotodon's tooth structure also indicates that harsh types of food were preferred. The front incisors of the Diprotodon also grew continuously throughout life.
- **the foot shape** of both animals appear similar (see below).



Diprotodon (3)
© Peter Murray

Wombat (4)
© Linda Dennis

The last of the megafauna became extinct between 25 thousand and 15 thousand years ago and there are several variables relating to their decline. Climatic change appears to have had considerable influence over their demise, particularly a drought at the end of the ice age which may have killed off large numbers at the same time. Also, an increased use of fire for hunting purposes by the Aboriginal people may have affected their decline. Although there is no evidence that the Aboriginal people hunted the Diprotodon specifically, Diprotodon skeletal remains have been found with butchering marks.

In 1830, by the light of torches and fire, the first skeletal remains of the Diprotodon were found in the Wellington Caves area in New South Wales. In more recent history, further Diprotodon bones were found when the phosphate mine was excavated in the same area. Diprotodon bones have been found in many areas around Australia, particularly in the

inland areas. Diprotodon has not been found in Tasmania, although bones have been found at Kangaroo Island.

Today there are three species of wombat, which come under the family category of *Vombatidae*. Two belong to the Hairy-Nosed genus, *Lasiorhinus*. They are the Southern Hairy-Nosed Wombat and the Northern Hairy-Nosed Wombat.

From the neck to the tail the hairy-nosed wombats and the Bare-Nosed Wombat appear very similar. It is the head shape and facial structure of these two families that show striking visual difference. The Hairy-Nosed Wombats have broad totally furred noses and larger pointed ears, while the Bare-Nosed Wombat has a naked rhinarium and its ears are smaller and daintier.

The Northern Hairy-Nosed Wombats snout is slightly longer than the Southern Hairy-Nosed and is flatter on the end. The Hairy-Nosed Wombats also have softer and sleeker fur than that of their cousin the Bare-Nosed Wombat, whose fur is quite bristled and course.

Although the two species may look similar in appearance the Hairy-Nosed species in fact have less in common genetically with Bare-Nosed Wombats than humans do with chimpanzees! (Woodford, 2001). The Northern Hairy-Nosed Wombats genetic code is 7 - 9% different from the Bare-Nosed Wombat (the difference in genetics between humans and chimpanzees is less than 1%). Scientific evidence shows that these two species of wombat have been separated for 4 or 5 million years.

© Western Plains Zoo (5)

Southern Hairy-Nosed Wombat

Lasiorhinus latifrons
(broad-headed hairy-nose)

The Southern Hairy-Nosed Wombat is found in small pockets of semi-arid land in South Australia and Western Australia.

In SA there are only six areas populated by the wombat; all west of the Murray River. In WA they can be found in a small area in the south-east corner only.

The Southern Hairy-Nosed wombat is currently under threat in South Australia from a mange infestation. Until recently mange has only affected Bare-Nosed Wombats, but there are currently large numbers of Southerns that are being found with the condition. The second largest population of Southern Hairy-Nosed Wombats, in the Murrayland area of South Australia, is under threat from the disease.

The Southern Hairy-Nosed Wombat weighs between 19 and 38kg and is up to approximately 0.9 metres in length. It lives for approximately 14 to 15 years in the wild.

The Rockhampton Zoo in Queensland currently has 16 Southern Hairy-Nosed Wombats as part of a research project aimed at developing husbandry and breeding techniques that can be applied to the Northern Hairy-Nosed Wombats when a captive population is established. There are currently 2 females carrying young after one of these females successfully raised young in 2003. All 3 young are the result of natural births.

The Southern Hairy-Nosed Wombat is classified as common and at low risk of extinction, but is limited throughout its range.

Northern Hairy-Nosed Wombat

Lasiorhinus krefftii
(Krefft's Hairy-Nose)


© Alan Horsup (6)

The critically endangered Northern Hairy-Nosed wombat is found in one tiny area in Central Queensland: Epping Forest National Park. There are approximately 135 individuals (at last count in 2007) living in the area which is classed as a scientific park and is not open to the public.

Only 500 hectares of the 3160 hectares of Epping Forest is suitable to the wombat, as most of the park's soils are heavy clays, which aren't suitable for burrows.

In 1869 fossil remains of the Northern Hairy-Nosed (the skull) were also found in the Wellington Caves area and the species was first described from this finding.
Records on wombat sizes vary from resource to resource, however the Queensland EPA website states that the Northern Hairy-Nosed wombat is the biggest of the three species. They can grow to 40kg and over 1 metre in length.

The Northern Hairy-Nosed Wombats decline is due to competition for food from introduced grazing animals - particularly during droughts. Help is on the way however. A dingo / dog proof fence was completed in 2002 and in 2005 9 kilometres of water pipeline and 15 automatic water points were installed throughout the wombat habitat (pers. comms. A. Horsup).

A major recovery program seeks to increase the wombats' numbers and to create new populations to ensure its long -term survival. The Rockhampton Zoo has 16 Southern Hairy-Nose Wombats as part of a research project aimed at developing husbandry and breeding techniques that can be applied to the Northern's when a captive population is establish.

A few years ago the Queensland Parks and Wildlife Services moved a small number of wombats to an area near St George in Queensland.

The third species is from the genus *Vombatus* and is known as the Bare-Nosed Wombat.


© Linda Dennis (7)

Bare-Nosed Wombat

Vombatus ursinus
(bear-like wombat)

The Bare-Nosed Wombat is commonly found in the south eastern side of Australia within the states of New South Wales, Victoria and Tasmania, including Flinders Island. It can also be found in a tiny area at the very south-eastern corner of Queensland and the in the south-eastern corner of South Australia.

There were once several species of *vombatus*, however all but the Bare-Nosed Wombat are now extinct.

There are three subspecies of *Vombatus ursinus*

continued over page

- *Vombatus ursinus ursinus* can be found on Flinders Island.
- *Vombatus ursinus tasmaniensis* is located only within Tasmania.
- *Vombatus ursinus hirsutus* is located in the south-eastern areas of the mainland.

Vombatus ursinus ursinus – The Flinders Island "Blonde Wombat" (8)
© Lila Sophia Tresemer

Vombatus ursinus tasmaniensis – Cradle Mountain (9)
© Brendan Trewartha

Vombatus ursinus hirsutus (10)
© Linda Dennis

chapter two

general biology and development

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taxonomy

Other names:

Common Wombat, Naked-Nosed Wombat, Forest Wombat, Coarse-Haired Wombat, Hill Wombat

Nomenclature:

PHYLUM	Chordate	
SUBPHYLUM	Vertebrata	
CLASS	Mammalia	
SUBCLASS	Marsupialia	
ORDER	Diprotodontia	
SUPERORDER	Vombatiformes	
FAMILY	Vombatidae	
GENUS	*Vombatus*	*"bear-like wombat"*
SPECIES	*ursinus*	
COMMON NAME	**Bare-Nosed Wombat**	

closest living relative

The wombat's closest living relative is the Koala, although the genetic code between the two differs by more than 20% (Woodford, 2001).

Although the wombat and the koala do share some basic similarities including sperm morphology, dental and basicranial features, a short tail which is almost invisible and a rear opening pouch enclosing two teats, the two have been divided into two distinct family groups to emphasise the degree of differences.

Wombats are classified as family *vombatidae* and koalas are classed as *phascolarctidae*.

Koala (12)
© Port Macquarie Koala Hospital

distribution

The Bare-Nosed Wombat is commonly found in the south eastern side of Australia within the states of New South Wales, Victoria and Tasmania It can also be found in a tiny area at the very south-eastern corner of Queensland and in the south-eastern corner of South Australia.

Subspecies *Vombatus ursinus ursinus* can be found on Flinders Island. *Vombatus ursinus tasmaniensis* is located only within Tasmania and *Vombatus ursinus hirsutus* is located in the south-eastern areas of the mainland.

habitat

The main habitat for the Bare-Nosed Wombat is forest covered and often in mountainous areas that are suitable for burrowing. There must be access to clearings with native grasses for grazing. It requires a temperate, humid micro-environment.

In New South Wales and Queensland the Bare-Nosed Wombat occurs mainly in sclerophyll forests, however with increased logging and farming activity wombats can also be found living in pine plantations and grazing land. In South Australia and Tasmania the Bare-Nosed Wombat can be found in more open vegetation including coastal scrub, woodlands and heath lands.

diet

The Bare-Nosed Wombat feeds mainly on native grass, herbivorous plants and the roots and bulbs of shrubs or trees. It also eats bark from native trees and a considerable amount of dirt.

Favoured native grasses include kangaroo grass, tussock, wallaby grass and spear grass. Introduced grasses are also eaten.

digestion

The Bare-Nosed Wombat is a herbivore. Unlike most other herbivorous marsupials, the wombat's stomach is quite small. Food passes from the stomach into the small intestine where lipids, proteins and soluble carbohydrates are digested and absorbed.

The most important part of the wombat's digestive system however, is the colon. Although all parts of the gut are found to have large numbers of bacteria, the numbers are three to eight times higher in the colon than in the stomach and small intestine (Triggs, 2002). Fibre is broken down in the colon by microbial fermentation, making the wombat a hindgut fermenter.

The wombat has a very slow metabolism, taking around 14 days for complete digestion.

reproduction

The wombat is polyoestrous which means that it has a series of oestrous cycles during a season (it can breed at any time throughout the year). Each cycle takes about 33 days to complete and has three distinct phases; pro-oestrous, oestrous and post-oestrous. The oestrous period, when the wombat is "on heat" is very brief, lasting only around 15 hours. During this period the females urogenital opening becomes moist and swollen. The pro-oestrous period is around 4 to 5 days and the post-oestrous period takes around 4 weeks. (Barnes, 2005).

When a female approaches oestrous (in the pro-oestrous period) she displays her scats in prominent places, such as on top of rocks. The pheromones in scats indicate to a male that she is approaching oestrous and will be ready to mate.

The courtship and mating ritual is particularly aggressive, and the male is often chased away after copulation. The male does not have any role in the upbringing of the joey.

Gestation is approximately 30 days where upon the embryonic joey crawls from the cloaca to the pouch, which is backward opening, probably to avoid dirt entering the pouch when the wombat digs. The joey attaches to one of two teats and stays permanently attached for around 5 months,

© Michele Barnes (13)

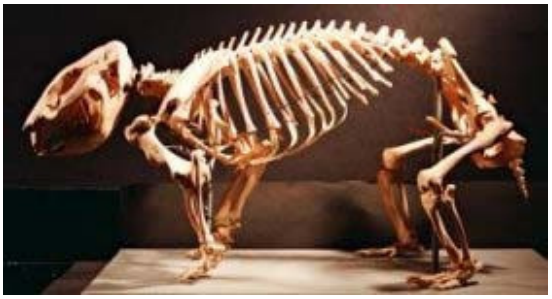
leaving the pouch permanently at around 10 months of age. Weaning is around 12 to 15 months of age, however the joey remains with its mother for a short time after weaning. It is usually independent at 18 months of age. At around 2 years, and weighing approximately 22kgs, the wombat is ready to become sexually active, however they generally start to breed at around 3 years of age.

skeletal

The Bare-Nosed Wombat is a vertebrate. Skeletons that define vertebrates consist of cartilage or bone, or sometimes both. Fish, amphibians, reptiles, birds and mammals are all vertebrates.

The skeleton supports the animal during growth, and for this reason vertebrates grow to much larger sizes than invertebrates. The skeleton consists of a skull, the vertebral column and in most cases, two set of limbs (forelimbs and hindlimbs). Snakes are an example of vertebrates without two sets of limbs, and whales are an example of vertebrates without one set of limbs. Most vertebrates share common bones, for example the femur, shinbones, foot and digits in the hindlimbs and the humerus, radius, ulna, wrist, hand and fingers in the forelimbs; and a pelvis.

A unique feature of the wombat's skeletal system is the hard plate that covers its rump area. The plate's function is solely for protecting the wombat from attack. In such situations, the wombat will enter its burrow, or an area where it can protect most of its body (eg: rock crevice) leaving the rump exposed. The hard surface protects the animal from serious injury. The wombat also uses the plate to slam its opponent against the top of the burrow.



wombat skeleton (14)
© University of Edinburgh

Bare-Nosed Wombat (15)
© Linda Dennis

The photo at left is of a male wombat that has used the plate to protect himself during an attack from a dominant male.

During the attack the fur was ripped out and the flesh was gouged but the plate stopped the skin from severe tearing. This photo shows the wombat several weeks after attack, when the skin had healed.

See **territorial aggression** in **case studies** chapter for more information.

The wombat has short stumpy looking legs and small paws with fleshy pads. It is classified as a "plantigrade" which is an animal that walks on the whole surface of their feet.

front paw **hind paw** (4)
© Linda Dennis

Their flat footed soles are very much suited to the normal activities of standing around eating grass or digging.

Wombats rarely reach high speeds so don't have the high balled foot pads such as canines. The front paws look similar to a dog's paw but are quite broader; ideal for digging. The hind paws are longer and built to shovel dirt away as the front paws dig.

The skeleton of an adult Bare-Nosed Wombat supports a weight of approximately 22-50 kilograms, the average being around 26kg. Length is approximately 900-1150 metres.

teeth


© Linda Dennis (16)

The Bare-Nosed Wombat has one set of upper and lower incisors that form the cutting edge. The lower incisors are forward pointing with chisel shaped ends.

There is one set of pre-molars top and bottom and four sets of enlarged molars (top and bottom) which enable the wombat to finely grind food. The molars have enamel on one side only, the side without enamel wears down much quicker than the enamelled side resulting in a sharp edge for cutting and chewing the abrasive grasses the wombat prefers.

There is a large gap between the front incisors and the rear molars and this is used to rearrange food with the tongue.

Unlike any other Australian marsupial the teeth are rootless and grow continuously to combat the coarse, abrasive nature of the grasses they prefer.

social structure

The Bare-Nosed Wombat is essentially solitary, however home ranges do overlap and burrows can often be shared, although rarely simultaneously. Bare-Nosed Wombats are known to aggressively defend their territory against intruding wombats.

Mother and offspring form a very strong bond with each other, which lasts until the young is ready for independence. Juvenile Bare-Nosed Wombats stay with their mothers and share their burrows for a short time after weaning (12-15 months of age) and are independent at approximately 18 months old. At this time the mother can become quite aggressive toward the juvenile, pushing the confused and frightened wombat out of its territory. However, female offspring have a better chance of sharing their mother's area than a male.

character

Wombats are known as the hobbits of the Australian bush (Woodford, 2001). They are considered as the most mysterious of Australia's marsupials as much of their lives are spent underground in their burrows (up to 16 hours daily. Jackson, 2005). They are rarely seen above ground as they tend to venture out mostly after dark, particularly in the warmer months of the year.

Wombats appear to be slow and cumbersome creatures that plod along while grazing their favourite harsh native grasses (see **diet** for more information). However, they can reach lightening speed if needed and have been known to reach speeds of up to 40 kilometres per hour - they can hold this speed for approximately 150 metres. Only a handful of men can hold 36 kilometres per hour over a 100 metre distance (Woodford, 2001).

Bare-Nosed Wombats are mainly solitary (see **social structure** for more information) and rarely spend time together, although wombats have been seen grazing in small herds where there are favourable pickings. Mothers and their young tend to have an intense bond which does not break until the joey is approximately 18 months to 2 years of age.

A Bare-Nosed Wombat joey is an endearing animal. Because of the strong bond an orphaned joey will have with its "human mum" many people wrongfully believe that a wombat would make an ideal pet. However, Bare-Nosed Wombats are particularly destructive animals and most have strong and wilful characters. While the joey is young this behaviour can seem cute and is easy to handle in such a small bundle, however when the wombat grows the stubborn streak and aggressive nature tends to grow with it and it can become nearly impossible to handle!

Adult wombats are very aggressive and will not hesitate to attack an intruder if they feel that they are threatened. Signs of an angry wombat that may be ready for attack are loud vocalisations (screams), teeth gnashing and ears down. If you meet a wombat in this state – run very fast in the other direction!

Wombats are very intelligent animals and seem to be on a par with the most intelligent species of canine. Certainly, they are the most intelligent of the world's marsupials.

wombat poo

Wombat poo is very dry in relation to other marsupials because the wombat is one of the most efficient consumers of water. A wombat doesn't need to drink water often during good conditions (eg: when the grass is green) and can obtain most of their fluid intake via the food they eat. This isn't to say they don't drink water at all, however. Wombats have been seen drinking from a water hole for up to 8 minutes without stopping (Triggs, 1996).

Although there is not a lot of published data on wombat poo, it is known that a wombat uses its faeces to communicate with other wombats; for example, to advertise territory and for females to show when they are on heat. The pheromones in the females poo indicates that she is ready to mate and male wombats use them as a tracking device.

To advertise territory or to show reproduction status, a wombat will leave its faeces in high prominent places, like on a rock or tree stump. Juvenile wombats are more discreet (so not to cause anger to older wombats) and defecate in hidden areas, such as under bushes.

Smaller wombats have small, moist and usually pointed faeces, similar in appearance to macropod poo. Adults have large squarish poo. The poo may look circular from the top, however in a 3D sense, when looking at the poo from all sides it looks like a cube. The larger the nuggets the bigger the wombat is. Male wombats often scratch the ground where they have defecated.

wombat poo (17)
© Linda Dennis

macropod poo (18)
© Linda Dennis

wombat flies

Wombat flies are tiny native Australian flies belonging to the tribe (a taxonomic classification between genus and family) *Borboroidini*. Entomologists have known for some time that many undescribed species of these little flies existed in the vast collections of the Australian Museum and Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO). What they didn't know was where to find them in the wild or anything about their preferred habitat or behaviour.

Recently a breakthrough discovery was made that may help to answer these questions. Researchers found that many species of this little-known group of flies are attracted to wombat dung and are most prevalent where there are wild wombat populations. This discovery has allowed entomologists at the Australian Museum to obtain better study collections and subsequently many new species of wombat fly have been discovered. The number of described species has been bumped up from two before the discovery to at least 24 at the present time, with over 90 per cent of these still to be described and named.

wombat fly (19)
© Australian Museum

Preliminary experiments show that the larvae of at least some species of wombat fly can live and develop in wombat dung. These findings suggest that a significant number of Australia's native insect fauna could be dependent on our native vertebrates for their continual survival.

In particular it shows the importance of conserving the natural populations of wombats not just for the sake of the wombats but to conserve the wombat fly fauna as well. It is intriguing to consider the possibility that Australia may have had a much richer and more diverse fauna of Borboroidini when the giant wombat-like *Diprotodon* abounded about 100,000 years ago.

wombat fly (20)
© Australian Museum

David McAlpine
Australian Museum
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longevity

There is little researched knowledge on how long Bare-Nosed Wombats live in the wild, however Barbara Triggs believes that it can be up to 15 years (Triggs, 1996).

It has been discovered, though, that Northern Hairy-Nosed Wombats can have a much longer life span.

Dr Alan Horsup - head of the Northern Hairy-Nosed Wombat Recovery Project - and his veterinary team have estimated that a male wombat, M23 (shown at right), is approximately 26 years of age! (A. Horsup, pers. comms)

So, if a Northern Hairy-Nosed Wombat can live in the wild for such a long period in such a harsh environment, it is thought that the Bare-Nosed Wombat can probably live as long or longer in the wild in good conditions. Formal studies are yet to prove this, however.

A 26 year old Northern Hairy-Nosed Wombat (21)
© DERM

© Linda Dennis (22)

Commonly, Bare-Nosed Wombats in captivity can live between 12 and 15 years of age, however the longest recorded period is 26 years of age (London Zoo – Flower, 1931).

The photo at right is of Chisel, a Bare-Nosed Wombat at Australia Zoo. He is estimated at being over 20 years old!

ageing a wombat

Chisel, a Bare-Nosed Wombat estimated at being over 20 years old. (23)
© Linda Dennis

Allocating an approximate age for a wombat joey is relatively easy. Many aspects are used to ascertain age including, weight, furred status, body structure and teeth eruption.

Once a wombat reaches adulthood (over 2 years of age) it is nearly impossible to age it.

The usual way to age any animal is via teeth growth and wear, however wombat's teeth grow continuously (see **teeth** section in **general biology and development**) making it difficult - near impossible - to age.

conservation status

The Bare-Nosed Wombat's status is classed as common / secure throughout most of its range in Australia, and is at low risk of extinction. (although many would disagree with this classification)

The South Australian population is considered vulnerable.

The Bare-Nosed Wombat is protected in most states except in eastern Victoria where it is considered vermin due to the damage it creates to rabbit proof fencing.

Humans are considered to be the wombat's worst enemy in relation to its survival.

Consider joeys of this size to be similar to premature babies - they do not venture out of the pouch

Birth **0.5 grams**

Hairless joey with well developed forelimbs (to aid in climbing from the cloaca to the pouch) with sharp claws. Hindlimbs are underdeveloped. Joey has a mouth with lips joined at outer edges. Most other organs, including the eyes are embryonic.

© Linda Dennis (24)

1 month old **5 grams**

Permanently attached to teat. Ears fused to top of head. Outer edges of lips fused together. Furless. Hind limbs developing.

© Linda Dennis (25)

3 months old **100 – 110 grams**

Facial structure is forming. The ears are fully unfolded but lying close to head. Whiskers forming but otherwise totally hairless. Lips still joined and permanently attached to teat.

The photo at right shows a joey at approximately 2 months of age. A 3 month old joey would appear similar but with fine whiskers around the snout and the ears would be detached from the head.

© Carol Pullar (26)

3.5 months old **230 – 250 grams**

At 3.5 months of age fine fur may be appearing on ears. Eyes starting to open. Permanently attached to teat.

4 months old **380 – 400 grams**

Eyes fully open. Lips beginning to separate.

approx 4½ months old
© Linda Dennis (27)

5 months old **750 – 800 grams**

Fine layer of fur developing on limbs. No longer permanently attached to teat and lips fully separated. Lower incisors erupting.

approx 5 months old
© Linda Dennis (28)

6 months old **1 - 1.5 kilograms**

At 6 months of age the fur approximately 1mm long over most of the body. Skin on nose and soles of feet are pink. First molars are visible and upper incisors are erupting. Occasionally popping head out of pouch.

approx 6 months old
© Linda Dennis (29)

7 months old **2 - 2.5 kilograms**

Fur is getting thicker. **Joey ventures out of pouch when in burrow and only for short periods**. Premolars and second molars are erupting.

approx 7 months old
© Linda Dennis (30)

8 months old **3 – 3.5 kilograms**

Fully furred. Large ears, appearing too large for head. Tail still visible. Out of pouch more often and quite active while still in burrow. Nibbles grass while poking head out of pouch. Starting to emerge while out of the burrow.

approx 8 months old
© Linda Dennis (31)

9 – 11 months old **3.5 – 6.5 kilograms**

Joey leaves the pouch permanently during this period. Skin on nose and on soles of feet is darkening. Still suckles from the teat, which can be elongated and protruding out of the pouch. Stays close to the mother whenever out of the burrow, often not breaking physical contact. Eats more and more grass and maybe its mother scats to increase gut flora.

approx 10 months old
© Linda Dennis (32)

12 – 15 months old **7 - 19 kilograms**

Weight range for 12 months of age is from 7.3 to 11.3 kilograms and 12 to 19 kilograms for 15 months of age.

Joey is weaned during this period but remains with the mother for some time

approx. 12 months old
© Linda Dennis (33)

18 months old **16 – 24 kilograms**

Usually independent at this age.

approx 18 months old
© Linda Dennis (7)

Data adapted from Growth and Development Table. The Wombat – Bare-Nosed Wombats in Australia. ***Barbara Triggs****.*

rescuing

© Linda Dennis (34)

golden rules of rescue

YOU – SAFETY FIRST
THE WOMBAT – WARMTH, DARKNESS, QUIETNESS

Before you rescue an injured, sick or orphaned animal you need to assess the situation and ensure that YOU will be safe. For example; if there is an injured wombat on the road, before you rush out to collect it assess the situation and make sure you will not be hit by a car.

As with any native animal that comes into care, a wombat of any age will be highly distressed, and it may also be in shock. Distress and shock can lead to serious illness or even death.

Keep the wombat warm, but within the advisable temperature range (see **temperature** sections in **raising orphaned joeys** and **caring for larger wombats**). **Remember!** that wombats cannot tolerate high temperatures and heat stress can lead to death.

Enclose the wombat so that it is in the dark, this will calm the wombat down and stress levels should be reduced.

Place the animal somewhere quiet. While driving in the car don't play the radio and try to keep any children or domestic animals quiet. If possible it is better to leave children and domestic pets at home while you rescue the wombat.

rescue kit

- A heat source - EG: a hot water bottle (filled with hot water only – not boiling , and wrapped in a towel), grain filled bag or something similar
- Thermometer for checking temperature. Place probe near wombat and place the thermometer unit where it can be easily seen. See **temperature** sections in **raising orphaned joeys** and **caring for adult wombats** for the correct temperature.
- Scissors
- Antiseptic, such as Dettol
- Pouches, liners, bags and blankets of assorted sizes
- Torch
- Milk replacer
- Electrolyte fluid, such as Vitrate or Glucodine
- Bottles and teats
- Syringes
- Disposable gloves
- Paw paw ointment (a great natural wound cleaner and healer)
- Wet Ones (alcoholic hand wipes to clean your hands after rescue)
- Safety pins (to pin pouch liners together)
- Vet wrap and assorted bandages
- Tick Twister

© Linda Dennis (35)

rescue technique

Large wombat rescues are rare, but are sometimes needed. Main causes for rescue include illness from mange or injuries sustained from being hit by a car.

Beware of the teeth and claws of a wombat. Wombats have incredibly aggressive natures and will readily attack. An angry wombat may try to bite your hands, arms or legs. Wombats suffer from mange and the parasite can be transferred to humans, so ensure that an infected animal does not make contact with skin and that clothes and equipment are disinfected after rescue.

© Linda Dennis (36)

To Capture a wombat throw a thick blanket over the animal or try to coerce it into a box or cage. The wombat may attempt to retreat to a burrow entrance or under a log and then put its rump toward you. Be very careful when you attempt to capture the wombat as it may try to crush your hands between its hard rump (see **skeletal** section in **general biology and development**) and the roof of the hollow or log.

To Handle a wombat, hold it under its forelimbs, close to its body, so it cannot reach your hands to bite them. Hold the wombat so that its back is toward you (see photos below).

To Transport a wombat use a large wooden or plastic crate, but small enough so that it can't slide or thrash around inside it. It is important to use a strong box as the wombat may attempt to dig itself out. A hessian bag is not the best option as the course fibres can cause rubbing injuries to flesh, however one can be used in an emergency for an adult wombat. Lay the bag down and place a heavy blanket over for restraint and security. Ensure that the correct temperature is maintained and that the wombat can breathe easily.

The recommended way to hold a wombat:

© Linda Dennis (37)

smaller wombats

Hold a smaller wombat with hands under the forelimbs

© Linda Dennis (38)

larger wombats

Hold a larger wombat with arm across the body under the forelimbs

Place hand or arm as close to the armpits as possible so that the wombat cannot reach down and bite you.

female fatalities

If a female wombat is found dead you should always check inside the pouch as you may find a joey still alive inside. Although the dead mother may appear bloated and "old" there still may be life inside the pouch as a wombat joey can live for up to 5 days after the mother has died.

The size of the mother's teats will give you a good idea if there is young at heel. When not in use the teat is quite small, however it elongates during use. If the wombat has a joey at foot the teat will be very long so that the end can extend past the pouch opening for the joey to suckle.

If the teat appears to be "in use" you should consider checking the nearby area for the joey. It will be relatively defenceless without its mother and is unlikely to survive the night and is good prey for a hungry dog or fox.

This photo shows a female wombat that has been killed after being hit by a car. Her joey is unharmed, but is trying to re-enter the pouch which has become inverted. (39)
© Carol Pullar

removing a joey from the pouch

Sometimes the act of rescuing a joey from its mother's pouch can do more damage than good if it is not done the correct way. If the mother has already reached rigor mortis (stiffening of the body after death) the pouch opening may be quite small and tight and removing the joey may be difficult and could cause injury. Even if the body is still soft there may not be enough room to manoeuvre and free the joey without damaging it.

Joey in the mothers pouch (40)
© Michelle Barnes

In most situations it is better to use a pair of scissors to cut the joey free - of course this can have its problems also. Cutting the flesh of an animal is undoubtedly distressing for the person who is doing the cutting. It is a horrible sensation, however it is definitely the best way to remove a joey from the pouch. Take a deep breath, put your squeamishness aside get and the job done. **Remember!** the mother is dead and won't feel a thing!

The best way to cut a joey out of the pouch is to move the mother so that it is lying on its back with its hind legs toward your body. Insert your hand, or at least a few fingers, into the pouch and lift the pouch as high as you can. Make sure that your fingers lie between the scissor blades and the joey - this is where you may have problems - don't cut yourself or the joey!

Cut ***very slowly*** until you can see clearly and have enough space to gently remove the joey. **Remember!** that furless and just furred joeys have their lips fused and are permanently attached to the teat - so if you find one at this stage you will need to cut the

teat off the mother entirely. Cut the teat as close to the mother's body as you can and remove the joey with the teat still in the mouth.

If you don't have a pair of scissors and cannot cut the pouch open try to enclose the joey in your hand. Move your fingers to the end of the snout and gently push the sides of the mouth and ease the teat out of the mouth. It must be noted that this action may rip and damage the mouth so be very careful.

To remove the joey from the pouch use a towel, a soft cloth or an inner liner that you will use as a makeshift pouch and glove it over your hand. Reach in very slowly and gently and try to envelop the joey. This action will also rub the mothers scent onto the towel which will help keep the joey calm after it has been removed. If the mother has been dead for some time and has a rotting smell it is best to avoid scenting the towel (George et al, 1995).

As you pull the joey out of the pouch move the towel up and over the joey enclosing it with the towel. The towel, with the joey enclosed, can then be placed inside warmer wrapping. The number of wrappings will depend on the size of the joey - small furless or just furred joeys will require more warmth than larger furred joeys.

If you have a furless or just furred joey, pin the mother's teat to the towel so that the joey doesn't end up getting it stuck in the airway. Put the pin on the outside of the towel, away from fragile skin. The joey should release the teat after about 3 hours (Staker, 2001).

A joey needs to be kept warm once you have removed it from the pouch. If you have a heat source, such as a hot water bottle, wrap it in another towel and place it between the inner liner and the warm wrappings. Do not place a heat source directly next to the joey as it may cause burns or heat stress. See the **temperature** section in **raising orphaned joeys** for correct temperature settings.

If you don't have any warm wrappings or a heat source place a furred joey in a spot that will stay warm and is away from drafts. Place another towel or blanket over the joey so that it is in the dark and will feel secure.

If you have a furless or just furred joey, place it inside your clothes close to your chest (still wrapped in the inner liner). The joey will get heat from your body and your heart beat will also calm the joey.

snug as a ~~bug~~ wombat in a rug (41)
© Marg Larner

assessing injury

The first rule of assessing injuries is to look for blood and if there is any, to stop the flow. This can be done by applying pressure to the area either by pressing down with your hands or binding the area with a bandage.

Once any blood flow is stopped then you can assess the wombat for any other injuries such as open wounds, bruising or breaks to bones.

If a break is found on a limb then try to immobilise it by using a splint and bandage. Don't place the splint directly on the wombat's flesh as it may cause skin or flesh injury. If you can, try to wrap the splint in cloth before placement. If a break is found on the body try to immobilise the wombat as best you can and seek appropriate help.

Generally, the younger the wombat is the better chance it has of healing if it has been injured. Depending on the severity, breaks of the bone can be healed successfully on a "green" bone, which is the softer, more flexible bone of a young animal. However breaks

in an adult wombat can rarely be healed - due more to the fact that the animal will need to be in care for a long period, which will cause enormous distress on the animal (see **caring for larger wombats** for more information).

Sadly, in many instances an adult wombat that is severely injured or sick cannot be saved. In these situations it is better to quickly euthanase the wombat.

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The best method to euthanase an adult wombat is a quick shot to the brain. The **X** shown in the graphic at left is the best place to position the gun muzzle. Alternatively, the gun muzzle can be placed on the back of the scull, between the ears.

Euthanasing any animal is most unpleasant and can be quite distressing for the person performing the task. If you feel that you cannot carry out the job then you need to get the wombat to the nearest vet as soon as possible. Most vets will carry out euthanasia free of charge.

Alternatively, try to find a person who can carry out the task for you, for example; a local farmer.

Often times - when help is hard to find – kind hearted local police men or women may be able to assist you. **Remember!** however that there are reports that the police need to complete each time a weapon is fired, so it is recommended that you contact them as a last resort only.

For information on **Small Animal Euthanasia at Home** please visit
www.alysion.org/euthanasia

hydration

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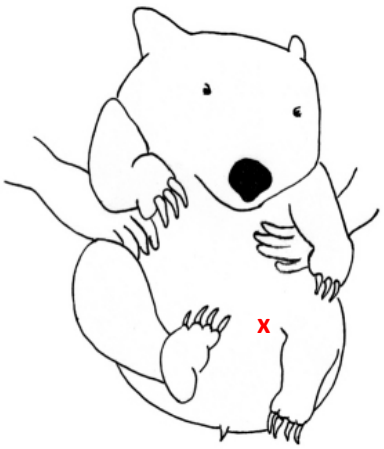
checking hydration

It is vitally important to keep a wombat of any age adequately hydrated - and this means with water and not milk formula. De-hydration can cause all kinds of problems including constipation and - at the more extreme end - problems with internal organs.

There are a couple of ways to check how hydrated a wombat is. The pinch test will show if the wombat is 10% de-hydrated or over. If the wombat shows signs of being de-hydrated in this range it will require sub-cutaneous injection immediately.

To check if the wombat is dehydrated 10% or over gently pinch the skin around the folds of the tummy and leg (marked **x** on the graphic at right), pull the skin slightly upward and let go. If the skin goes back down straight away the wombat shouldn't need sub-cutaneous fluids but it will still require some oral electrolyte fluids like Vitrate, Lectate or Glucodine. If it takes a few seconds the wombat will require sub-cutaneous injection (see **sub-cutaneous injection** section in this chapter for more information).



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However it is at the 10% de-hydrated mark where problems start to occur, and as carers this is what we want to avoid. It is better management practise to *continually* check that the wombat is hydrated sufficiently and this can be done using a very simple technique.

Using your (clean) finger gently rub along the gum line. As wombats can be aggressive this can only really be performed on a small joey or one that is used to human contact. Remember that your safety always comes first so only perform this technique when you are confident that you can handle the wombat.

If the gum feels tacky the wombat is approximately 5% dehydrated and will require oral re-hydration. If the gums feel slippery the wombat is adequately hydrated.

If you don't have an electrolyte fluid such as Vitrate or Lectate (both available at most vet clinics) or Glucodine (available from supermarkets and chemists) then the following recipe can be used:

- 1 cup of tepid water (not cold, not hot) – *use pre-boiled water*
- 1 teaspoon of sugar
- a pinch of salt (add until you can just taste the salt)

Offer as much fluid as the wombat will take via a bottle or a bowl (depending on the age) – if using a bottle do not force the fluid into the wombat's mouth as it may enter the lungs. If you are offering too much the wombat will have soft poo which can turn into diarrhoea, so adjust accordingly.

It is very important to remember that you should not feed a wombat any milk replacer or solids until it has been re-hydrated appropriately and is warm (see **temperature** sections in **raising orphan joeys** and **caring for larger wombats**), as the food will not be digested properly and can cause illness or disease.

offering water as part of a healthy diet

A wombat that is in care will need to have water available to it at all times. **Remember!** that milk replacer is ***food*** and is not considered as a hydrating substance.

For smaller joeys water can be offered in a bottle between milk bottles. When offering water to a furless or just furred joey you should always use pre-boiled warm water as their immune systems are not developed and they cannot tolerate any contact with bacteria. Once the joey is fully furred its immune system should be properly developed and can cope with bacteria that may live in water, so the water doesn't need to be boiled. If the joey is unwell however it may then have a compromised immune system and you should use pre-boiled water. See **the unwell joey** section in **raising orphaned joeys** for more information.

Rain water is best to use – after all this is the water the wombat will be drinking when moved into the outside enclosure and later when released. It is a good idea to introduce rain water - or water from a dam or stream at the release site - into the wombat's diet before you move it outside so that it can be monitored for any reactions.

As town water is chemically treated it may be advisable to continue boiling the water if you don't have a tank to collect rain water or if you cannot source water from the release site.

A larger joey should be offered fresh water in a deep bowl. Wombats don't lap water but rather suck water up, similar to using a straw, so if the bowl is too shallow the wombat may not be able to drink.

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increasing water intake during diarrhoea

Diarrhoea in any marsupial is often a sign that something is wrong, for example; a bacterial infection or distress. It can also mean that the animal has eaten something bad, eg: a weed or rich grass, and has an upset belly.

Nevertheless, a bout of diarrhoea will compromise the joey and it should never be ignored. If diarrhoea is left unchecked the joey will lose energy and may become even sicker.

It is the job of the carer to sift through the history of the animal (and this is where record keeping is so important – see **keeping accurate records** in **raising orphaned joeys** for more information) - to try and determine the reason for the diarrhoea.

The first step when an animal is suffering diarrhoea is to re-hydrate it. There are several electrolyte solutions available including Lectate and Vitrate, both available from most veterinary clinics. Alternatively, Glucodine can be used, which is available from most supermarkets. If these products are not at hand a mixture of water, sugar and salt can be used. See **checking hydration** for further information.

Peptosyl or Koamagma can be offered during bouts of diarrhoea. These products will help firm up the poo and will also line and sooth the gut. Keep in mind, however, that it is best to find the cause of the diarrhoea and not to just treat the symptoms. Some vets don't advocate diarrhoea suppressants as the poo is being hastily evacuated for a reason and it should not be suppressed. However, it is the carers choice (based on the needs of an individual animal) if these products are to be used. Peptosyl is available from vet clinics and Koamagma is available from chemists.

At the first sign of diarrhoea, the gut should be rested for around 24 hours. It is recommended that you reduce but not cut out their milk intake totally during this time as the joey will need energy to recover. Offer the electrolyte solution in place of a normal bottle. Don't offer too much water though as this may flood the gut and contribute to the diarrhoea A rough guide is to offer the joey approximately 20% of its body weight in fluid.

Remember! diarrhoea should never be ignored. If the joey isn't showing signs of improvement by the third day it will need veterinary attention as soon as possible. Use your judgement however; for example, if the joey is worse by the second day get it to the vet quicker.

sub-cutaneous injection

Sub-cutaneous injection is a skill set that all wildlife carers should have, particularly if the carer lives remotely. There are occasions when this procedure is critically needed and realistically most carers do not have access to a vet 24 hours a day, 7 days a week.

However, performing sub-cutaneous injection can be a particularly distressing procedure – for both the animal and the care giver. It is recommended that you only attempt to perform this task if you are experienced or are ultra confident that you can do the job without hurting the animal. If done incorrectly the animal may be in pain.

Ideally, administering sub-cutaneous fluids should only be attempted if you have assisted a veterinarian or a vet nurse, have been trained to perform an injection or have witnessed it being done on several occasions. If you do not feel confident you should not attempt the procedure and should take the wombat to a vet clinic as soon as possible.

PRACTISE, PRACTISE, PRACTISE! Before you attempt to perform sub-cutaneous injection on a live animal learn how to do it by practising on as many dead animals as you can and by assisting your vet. **Remember!** dead animals don't feel a thing – and it is better to learn and make mistakes on them rather than on a living animal.

Always listen to your vet. Your vet has been through training to learn how to perform sub-cutaneous injection. If he / she does not think you are capable of performing sub-cutaneous injection then don't! You may end up doing more damage than good.

Allow your vet to guide and train you in the procedure. Offer to help your vet perform sub-cutaneous injection as often as you can. It is also a good idea to ask your vet to critique your technique.

It is recommended that you do not try any other re-hydration techniques (for example, a drip). These methods can be very difficult and ought to be performed by a qualified veterinarian - or you should seek extensive training in the procedure.

The procedure:

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The **x** indicates the best sites to inject sub-cutaneous fluids. When giving sub-cut fluids you will need to distribute the fluid over 4 sites. Do not inject the fluid into one area as you will end up with a massive balloon of water, which will do more damage than good.

The fluid to use for sub-cutaneous injections (in most cases) is Hartmann's Solution*. **Remember!** Hartman's should not be used for burn victims as it may kill the animal. The general rule for the amount of sub-cutaneous fluid to be injected is 10% of the animal's body weight. The fluid must be at room temperature – not cold and not hot. Hartmann's can be purchased from veterinary clinics or alternately you can approach hospitals to see if you can have used bags, as one bag can only be used for one human procedure and is then generally discarded. If you advise what you are using it for they may give you a bag free of charge.

If the wombat is very flat and has no energy then a solution can be mixed with the Hartmann's. The ratio of glucose to Hartmann's is *very* specific and if given incorrectly may result in severe complications. For this type of re-hydration you ought to take the wombat to a veterinarian as soon as possible.

To administer sub-cutaneous fluids you can use a syringe needle, however you need to ensure that the wombat is very well restrained during the procedure. If the wombat moves, the needle, being inflexible, will not move with the wombat, and the needle could push further into the body and either snap off or pierce organs, etc.

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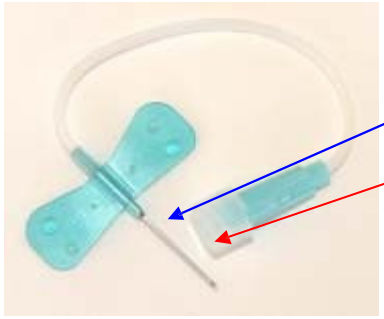
The size of the needle used for sub-cutaneous injection is different for different species of animal. Generally, smaller needles are best. However, to find out the best sized needles to use consult your vet or an experienced carer.



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A winged infusion set is an excellent option for administering sub-cutaneous fluid.

The needle of the set is inserted into the appropriate area of the wombat and taped to keep in place.
The needle of the syringe, filled with Hartmann's solution, is inserted into the plug at the other end.

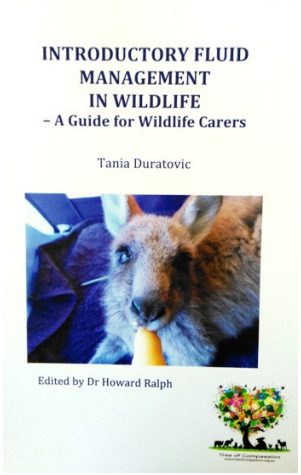
This method is ideal, for if the wombat moves, the tubing of the set will move with it and the needle will not be pushed in further.

Sub-cutaneous injection should not be performed on an individual more than once a day. **Remember!** this procedure can be quite distressing for the animal and prolonged or continued exposure may result in severe distress.

Remember! to never rush sub-cutaneous injection. Make sure your work area is quiet, that the wombat is securely wrapped and not stressed and then take your time.

* For burn victims the solution to use is 0.9% Sodium Chloride. Sodium Chloride can also be used in general sub-cutaneous injection.

For more advanced information on how to perform sub-cutaneous injection please see Tania Duratovic's guide "Introductory Fluid Management in Wildlife"
www.treeofcompassion.org.au



The bottom line:

If you are not confident, are inexperienced or rush a sub-cutaneous injection, damage can be done and may be severe.

chapter five

raising orphaned joeys

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dedication

To raise a wombat joey you need to be highly dedicated and have a lot of time on your hands to tend to their very specific needs. A joey that is received at the furless or just furred stage will be in care for 18 months to 2 years – that's the longest care period of any Australian marsupial.

Furless and just furred joeys need to be fed around the clock – this means *day and night*. If you don't like your sleep interrupted (so that you can feed a small joey) then you should consider not taking on a joey of this size. You need to have incredible dedication to tend to a joey that needs around the clock feeding.

Wombat joeys have a very strong relationship with their wombat mums. In the burrow, when a joey is first venturing out of the pouch, and during the early "at foot" period, a joey will tend to keep tactile contact with its mother most of the time. A similar bond is made with a hand reared orphan and its "human mum" – the orphan to carer bond can be very strong so you must ensure that you have time, patience and dedication when taking on an orphaned Bare-Nosed Wombat.

Wombat joeys raised without a buddy (see **the benefits of buddying** section for more information) may want to be with their human mum all the time, and may even want to be held and cuddled while they are asleep. A joey that wants company but is ignored may become considerably distressed.

Because of this bond a joey may also become significantly distressed when moved to another carer. It is appropriate, where ever possible, to keep the joey with one carer throughout its time in care. A carer with a soft release site is the best option for a wombat joey, as the connection to the carer will give the wombat security and confidence to move off into the wild when the time comes.

viability

Before you even contemplate raising an orphaned joey you must assess its viability. This may sound harsh, however keep in mind that our aim as carers is to release a joey back into the wild that is fully capable of living a wombat life unaided by humans.

Attempting to raise a joey that is not viable may compromise it – and signs may not be seen until months down the track. It may not survive in the wild on its own when it is eventually released.

When determining viability you should use the age factor of the animal and not just the weight of the animal, which may be misleading if the joey is de-hydrated when it first arrives in care, which can often be the case.

There are many schools of thought when it comes to the viability of a joey. Consider these "textbook" points when you are assessing a joey for viability:

- **Wombat joeys that have their mouths totally fused** - under the 3 month stage – are generally too young to raise successfully, and they *rarely** survive longer than a few days in care anyway. Joeys of this age are under the 110 gram weight. Their bodies are not fully formed and they have little to no immune system. It is kinder to humanely euthanase a joey of this size. A veterinarian will be able to put the joey to sleep for you, quickly and painlessly.


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** It should be noted, that wombats have been successfully raised from this stage, however intense dedication is required (see **dedication** section for more information).*

- **A joey at the 3 to 4 month stage is considered viable**, however the general rule is – if the ears are lying flat to the head it may be kinder to humanely euthanase. Think long and hard before you make a decision to take a joey of this size on as it will be a immense challenge and you will have to be totally dedicated to the joey, feeding it around every 2 - 4 hours *day and night* (depending on the age and the individual joey's needs). Joeys at this stage weigh around 110 grams (3 months,) 250 grams (3.5 months) and 400 grams (4 months). They have very weak immune systems. Eyes are just beginning to open at the 3 month stage and lips are only just beginning to separate at the 4 month mark.

- **A joey at the 5 month stage has extremely good prospects if received into care in good health.** The joey's lips have fully separated and it is no longer permanently attached to the teat. At this age the joey weighs around 750 to 800 grams. It has a fine layer of fur on side of limbs and the lower incisors are erupting.


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Your decision on the viability of a joey should be made *for the joey* and, as harsh as it sounds - not for your own emotional need. Sometimes, although it may break our hearts, it is kinder to take the joey to the vet's and have it euthanased.

Alternatively, if you believe that nature should take its course and it is not *your* decision as to whether the joey is considered viable, make the joey comfortable and tend to it as you normally would. If it's not meant to be the joey will slip off to sleep and not wake up – mother nature has done her thing.

getting the joey settled

Any wild animal that has been orphaned and received into care will initially see the carer as a predator. It is a terribly frightening time for the joey and all steps must be taken to make the transition easy and as stress free as possible.

It can take one to two weeks - sometimes more, sometimes less - for a joey to realise that their new "mum" is friend and not foe. During this time it is essential to handle the joey as little as possible and to keep it safe and secure in its pouch.

So that the joey becomes accustomed to the carer's voice and smell it is advisable to carry the joey (in its secure pouch) close to the body as much as possible. This will help to ease the transition and the joey will be accepting you as its "mum" sooner rather than later – and without the joey becoming unwell due to distress (see **the unwell joey** section in this chapter).


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Keep the area where the joey is housed as quiet as possible. Loud noises, such as the radio, children playing or the television blaring will only distress the joey. After time, when the joey is used to being in care these sounds will become less frightening and your home can return to some kind of normality.

It is important for any carer to realise that their home will not be normal for the initial stages of care. For a short time, the world totally revolves around the wombat!

keeping accurate records

Keeping accurate records is an essential management tool when caring for any native animal.

There are several reasons for this:

- **Keeping a well documented history will help you if anything goes wrong with the joey while it is in care.** If a joey becomes unwell you can go back through your notes to find out if there is a change in diet, sleep patterns, poo, etc.
- **Vets appreciate a good history of any animal that is brought in for a consult** – the more you can tell them the easier it is to diagnose an illness, disease or problem.
- **You can ascertain that the joey is gaining weight according to progression charts**. Although progression charts are an indicator only (each animal is individual and there may be healthy variations from the chart), they give you an excellent idea of where a joey should be at a particular age.

Keep as much detail as you can. Examples of information that can be included in your records are:

- **Date of entry** so that you know when an unusual occurrence or a change has happened.
- **Type of entry** – eg: **MEDICATION**, **WEIGHT**, **POO CHANGE**, **MILK INCREASE**. I find that if these entries are colour coded it is much easier to retrieve relevant information when needed quickly.
- **A description of what the occurrence is** – eg: ***Wombat has soft poo today. Soft and "toothpasty" although not watery. May be due to increased rich grass intake?***

Wombat joey being weighed (49)
© Linda Dennis

Milk intake, poo and mood changes are probably the most important record to keep and should be noted daily. Consider keeping a daily record of this information even if you are a bit forgetful to record other information regularly – this alone will be able to help a veterinarian make a diagnosis if the joey becomes ill. The table on the next page is a good example of a daily record.

How to use the POO & MOOD section:

Circle the appropriate entry after each poo.

- **Yellow** **Brown**. Poo Colour is important whey trying to identify some illnesses. Green poo can be marked in between the other entries.
- **Scours** **Firm**. If the animal is scouring you know that something may not be right with the wombat. On one extreme it could tell you that the joey is sick, or on the other extreme the formula is too watery (not so serious, but still requiring changes to the wombat's care / routine). Soft poo can be marked between the two other entries.
- ☺ - /. This is the mood indicator. Smiley face is good – the joey is happy. The second would show that the joey is so-so, not in a great mood, but not distressed. The unhappy face would be used if the joey is distressed or lethargic.

So, if the joey has yellow poo, has the scours and is in an unhappy mood you know to get the joey to the vet ASAP!

Daily Milk, Poo & Mood Chart

Critter Name:

MILK									POO & MOOD					
Date	Aim	1st	2nd	3rd	4th	5th	6th	T	1st	2nd	3rd	4th	5th	6th
									Yellow Brown Scours Firm ☺ - /	Yellow Brown Scours Firm ☺ - /	Yellow Brown Scours Firm ☺ - /	Yellow Brown Scours Firm ☺ - /	Yellow Brown Scours Firm ☺ - /	Yellow Brown Scours Firm ☺ - /
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equipment for bottle feeding

You will need to have the following equipment to feed a wombat joey:

- **Milk formula** of carer's choice (see **milk formula** in this chapter for more information).
- **Bottles** of carer's choice (see **bottles** in this chapter for more information). There are two options available; glass or plastic.
- **Teats** (see **teats and holes** section in this chapter for more information).
- **Probiotics and Impact**. See **probiotics** in this chapter for more information.
- **Cloths** to wipe up spills. Chux clothes are ideal as they are soft and ultra absorbent. Cut one Chux into four for handy sized wipe cloths. Soft toilet paper or tissues can also be used (but are not so environmentally friendly). Don't use paper towel as it is too abrasive on fragile cloaca's. (See **toileting** in this chapter for more information on how to toilet a joey after feeding).
- **A container with warm water**. Some joeys take a long time to drink (and this is the way it should be) and the milk can cool, use the warm water to warm up the milk again.
- **A towel to place over your lap**. Joeys can be messy – they can also wee and poo while drinking!

milk formula

There are several good milk formulas that can be used for wombat joeys. The formulas are all low in lactose and have the required vitamins and minerals for a growing joey. Most carers have a favourite milk formula, however it is up to each individual carer to find out which product works best for them and the animals in their care.

Remember! that all marsupial joeys are lactose intolerant so cow's milk should not be offered, and this includes powdered and skim milk. Offering your joey cow's milk, even for short term periods, can make the joey ill.

A wombat joey will continue to take milk until it is approximately 12 to 15 months of age – that is between 10kg and 19kg. Of course, each individual animal is different, some may wean earlier than others, but it is important not to forcefully wean too soon (see **weaning** in this chapter for more information).

When offering a milk bottle ensure that you are using the correct teat. Wombaroo Food Products, Biolac and Bush Baby Teats offer a range of special teat for native animals. The type of teat to use will depend on carer preference and the age of the wombat. See **teats and holes** section in this chapter for more information.


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It is important to remember that milk replacers are **food** and not used to keep a joey hydrated. Always have water available for older joeys to drink and offer water in a bottle to smaller joeys (see **hydration** for more information).

Available milk formulas and distributors are listed on the next two pages (in alphabetical order of product name). Formulas can be purchased at most veterinary clinics and farm produce stores.

Biolac

Biolac has three milk formulas that can be used for macropod, koala and wombat joeys.

- **M-100** is used on furless joeys.
- **M-150** is a transitional milk and used on joeys when dense fur has developed.
- **M-200**, which contains elevated lipids in the form of canola oil, is used on joeys that are producing solid, dark pellets (poo).

Manufacturers for Biolac

Biolac
PO Box 93
BONNYRIGG NSW 2177
Phone / Fax: (02) 9823 9874
Website: www.biolac.com.au

Di-Vetelact

Di-Vetelact milk, made by Sharpe Laboratories, is a universal milk formula and can be offered to all Australian marsupials and also to farm animals and domestic pets.

Di-Vetelact is offered according to the weight of an animal. The general rule when offering Di-Vetelact to a native animal is 10% of body weight to survive and between 15% and 20% to thrive. This is, of course, while the joey is totally dependent on milk (furless and just furred) – once the joey is eating solids the quantity should be slowly reduced (see **weaning** in this chapter for more information).

Start on Dilution A and increase consistency slowly. Not all joeys will tolerate Dilution B and it may cause constipation or diarrhoea – so adjust accordingly.

Manufacturer details for Di-Vetelact

Sharpe Laboratories
Animal Health Division
12 Hope Street
ERMINGTON NSW 2115
Phone: (02) 9858 5622
Fax: (02) 9858 5957

Wombaroo

Wombaroo Food Products make three milk formulas specifically for wombat joeys and one universal milk formula.

- **Stage <.4** (under point 4) is for joeys that are less than 40% through pouch life. <.4 joeys are completely furless with pink skin, eyes closed and ears drooped to erect.
- **Stage .4** (point 4) is for joeys that are 40% through pouch life. They are furless to fine fur, eyes are open and ears are erect.
- **Stage >.6** (greater than point 6) is for joeys that are greater than 60% through pouch life. They are completely furred (short to dense long fur), and they spend time out of pouch.
- **Passwell Formula One** is a universal milk supplement that can be offered to all Australian marsupials and to domestic pets such as kitten and puppies. This formula is offered at 5% of body weight. The manufacturer suggests the total milk required be fed over 4 feeds a day.

Manufacturer details for Wombaroo

Wombaroo Food Products
8 Oborn Road
MT BARKER SA 5251
Phone (08) 8391 1713
Website: www.wombaroo.com.au

Considerations when choosing milk formulas:

- **To date there is no published data on changes in milk composition in wombats**.

- **Cow's milk** is not recommended for feeding marsupials as the milk has too much lactose, which marsupials are intolerant to. Lactose is poorly digested in marsupials and feeding cow's milk results in diarrhoea and other symptoms. See **Australian Mammals Biology and Captive Management** for scientific research into the use of milk formulas for marsupials.

- **When using the Wombaroo formula** it is important to follow the manufacturers recommendations regarding mixing up the formula and the quantities offered to a joey. By not offering enough milk the joey may fail to thrive, by offering too much the joey may develop diarrhoea.

- **Wombaroo formulas are specifically made for different ages**. <.4 is not a weaker consistency than .6 – it is a totally different formula. A joey at the <.4 stage will not tolerate .6 milk, even if it is watered down. You must feed the joey the correct milk.

- **With Wombaroo** you must ensure that you are giving extra water in between milk bottles. Wombaroo is a very thick formula and little hydration is received from the product. By not offering water problems may occur, like cystitis (see **the veterinary guide** for more information).

- **Wombaroo gives better growth rate and hair quality** than any other milk formula (Jackson, 2003).

- **Biolac and Di-Vetelact offers more freedom** for the milk quantity offered to a joey. It is considered by many that these may be better products for new time carers who haven't quite got the gist of the importance of Wombaroo accuracy. The quantity offered to joeys can be increased or decreased without problem.

- **If using Di-Vetelact** you may not need to offer as much water in between milk feeds, as with Wombaroo. The formula is watery and adequate hydration may be received from the milk formula alone. Ensure that you constantly keep checking on hydration, however, and offer water appropriately. See the **hydration** chapter for information on how to assess a joey's hydration status.

- **As Di-Vetelact is a very watery formula** it can sometimes cause diarrhoea in a joey, especially when Formula A is being used. Adjust the mixture accordingly.

- **Di-Vetelact should not be mixed to a stronger consistency than Dilution B** as this may cause constipation in the joey.

- **If using Di-Vetelact**, buying a 5kg tin direct from the manufacturer will save you considerably. A 375g tin from stores costs around $15. Buying in bulk will cost the equivalent of $7 to $8 for a 375g tin.

- **Biolac is offered based on a combination of age and weight and Di-Vetelact is offered based on weight.** It is important to remember however, that the recommended quantity to offer is for a joey that is totally dependent on milk (furless or just furred). As a joey starts to eat solids the quantity should be slowly reduced (see **weaning** in this chapter for more information).

- **According to CSIRO research, Biolac milk contains more lipid concentrations** (higher energy) and is closer to that of natural milk. Late lactation animals receive more "total energy" from Biolac milk than any other formula. (CSIRO. Jackson, 2003).

- **Biolac is more readily digested** than any another milk formula due to the ingredient galacto-oligasaccharides (special sugars) which are similar to the sugars found in natural marsupial milk. Therefore, using Biolac is likely to result in fewer problems such as diarrhoea. (CSIRO. Jackson, 2003).

- **Remember!** to always *transition* between milk formulas. This includes when moving through the different composition formulas of Biolac and Wombaroo, or if swapping a joey from one product to another.

An example of a transitioning (using Wombaroo):

- **80%** of Wombaroo .4 to **20%** of Wombaroo >.6
  Offer for approximately 3 days *
  eg – if the wombat joey was taking approximately 80mls per day you would mix 60mls of the .4 formula to 20ml of the >.6 formula.

- **50%** of Wombaroo .4 to **50%** of Wombaroo >.6
  Offer for approximately 3 days

- **20%** of Wombaroo .4 to **80%** of Wombaroo >.6
  Offer for approximately 3 days

- **On the tenth day**, and until the joey is weaned, you would offer the joey 100% of Wombaroo >.6

Use a similar technique when transitioning from one milk product to another.

* *3 days is a guide only, it is up to the carer to determine transition period based on the joey's needs – some may require more time on each transitional stage.*

probiotics

Regardless of the milk formula you choose for your joey it is recommended that probiotics be used as a general management tool every day - this is advice offered by Dr Anne Fowler BVSc, MACVSc (Torquay Animal House Vet Clinic). Dr Fowler, who is experienced in the care of wildlife, suggests that probiotics, such as those listed below, should be added to milk formulas daily and not just when the joey is ill. Using probiotics daily will *reduce* the chances of the joey becoming ill with a bacterial infection. **Remember!** that each animal is different and a probiotic that works well on one joey may cause problems with another – so adjust accordingly.

There are several good probiotics formulas to choose from:

- **Protexin** is wonderful mixture that increases gut flora. It comes in a liquid or powder form which can be added to a milk bottle (after the milk has been heated) or the liquid can be given directly by squirting into the mouth. It is very pricey however – approximately $60 for a 125ml bottle with a pump.

- **Inner Health** and **Inner Health Plus** are "human" probiotics that have been used very successfully in marsupial joeys. There are dairy free options (no lactose) that come in powder form in a 50g jar, costing around $30. The recommended dose is ⅛ of a teaspoon in each milk bottle (add after milk has been heated). Inner Health and Inner Health Plus can be purchased from most chemists and health food shops.

- **Yoghurt** is a probiotic derived from cow's milk. Quantities depend on carers preference and the joeys age. Use natural un-flavoured yoghurt only **Remember!** that marsupials are lactose *intolerant* not lactose *resistant*, so the low levels a joey will receive from yoghurt or other probiotics derived from cow's milk will not affect it.

- **Yakult**, is another "human" probiotic that can be used successfully. Quantities depend on carer's preference and the joey's age. A recommended mixture is 1 bottle

of Yakult per litre of milk, alternatively ½ a bottle of Yakult can be mixed with one litre of milk.

- **Acidophilus powder** is another good source of probiotic which is not derived from cow's milk. Again, quantities depend on individual carer's preference and the joey's needs. A recommended quantity is ⅛ of a teaspoon for a furless or just furred or ¼ teaspoon for a furred joey, mixed into each bottle of milk. Acidophilus can be purchased from most chemists and health food stores.

milk additives

Generally, other milk additives are not required if using milk formulas correctly, although some carers do like to add different elements for extra nutrition, vitamins or minerals. This is a personal choice for each carer.

Some additives include:

- **Wombaroo Impact** is a colostrum powder that is considered by many as an essential milk additive for furless or just furred joeys to boost the immune system. It can also be used for an unwell joey that may have a compromised immune system (see **the unwell joey** section in this chapter for more information). See the leaflet included in bottles of Impact for directions.

- **Heinz Baby Cereal Powder** is sometimes added to Di-Vetelact formula for added nutrition but should only be started once the joey has its eyes open and ears are starting to detach from head.

- **Olive or Canola Oil** is used to keep the coat shiny and in good quality. Only a few drops per bottle are needed.

water used for making milk formula

When mixing up milk formula you need water. Simple? Well, did you know there is water, and then there is water?

When mixing formula for a furless or just furred wombat joey you will need to use pre-boiled warm water. Pre-boiling is essential as joeys of this size have no immune system, or a weak immune system. The bugs that normally live in water - which humans are used to - can cause illness in a wombat joey as their immune systems are not strong enough to cope. It is for this reason that you must use pre-boiled water when making up formula.

As the joey grows older, usually when a good covering of fur is coating the body – and its immune system grows stronger - you may not need to continue boiling the water before use. It depends on the wombat however, if you have a wombat that seems a little fragile and is experiencing soft poo then you should continue boiling the water before use.

It also depends on where you live as to when you should stop pre-boiling water. If you live in town where the water is normally heavily treated for human consumption then it may be better to continue boiling water until the joey is fully furred and has a strong immune system. However, if you live out of town and are using tank water – rain water – then you may be able to stop pre-boiling water sooner.

However, use your common sense. If you are experiencing any problems with your wombat and you think it may be caused by the water you're using, continue pre-boiling until the joey is settled.

Handy Hint! – chemically treated town water can be left outside in a bucket for a period of 24 hours which will break down any additives and leave the water fresh and chemical free.

teats and holes

Different types of teats:

When choosing a teat for your joey keep in mind that the length of the latex teat should be a similar length to that of the joey's mouth. A teat that resembles the wombat mother's teat should be used for the joey's comfort, fit and for tooth eruption. However, it is up to each carer to assess what is best for each individual animal.

There are several companies that make good quality teats for native animals, including the following:

Biolac has a range of teats for native animals and there is one that is recommended for wombats. It is a short multi-purpose teat, called a **T3** teat. It can also be used for the Brushtail Possum, Koala and Flying Fox.

© Biolac (51)

© Biolac (52)

Some wombat joeys do have problems with sucking thick teats, however, so the **T1** teat could also be used. This teat is also used for macropod joeys. The T1 comes in hard or soft latex.

To see the range of latex teats by Biolac go to their website www.biolac.com.au.

Bush Baby Teats also make teats that can be used for wombats. The **SD** teat (Small Dog) teat is recommended for wombat joeys under the kilogram mark.

As the joey grows the Bush Baby **K1** or **K2** teat could be used. These teats have a similar diameter to the SD teat, but are longer.

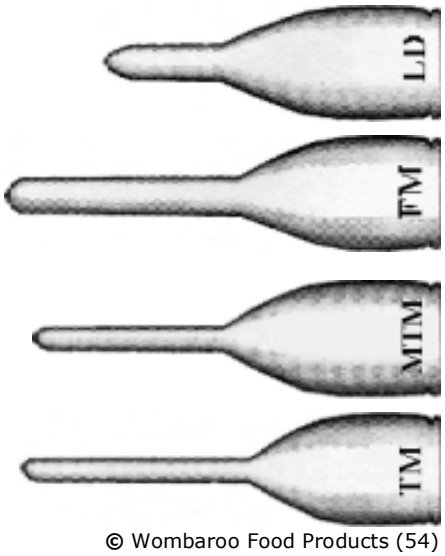

SD teat
© Australian Wildlife Supplies (53)

Bush Baby teats are available from Australian Wildlife Supplies.

Wild Baby Teats also provide a range of teats, including those suitable for the different age stages of wombats. Contact WildBabyTeats@bigpond.com for more information or visit Ebay where the teats can be purchased (seller name **dezneric**).

Wombaroo Food Products make a range of special teats for native animals, and there are two recommended for wombat's joeys. Each individual joey is different, however, and some joeys may not take to a particular type of teat. Below are a range of Wombaroo teats that have been used successfully on wombat joeys.

- **LD Teat**. LD stands for Large Dog. Wombaroo recommend LD teats for small wombats.
- **FM Teat**. FM stands for Fat Marsupial. Wombaroo recommend FM teats for larger wombats.
- **MTM Teat**. MTM stands for Medium Thin Marsupial. This teat is often used for in-pouch macropods and possums. It has also been used successfully on furless or just furred wombat joeys.
- **TM Teat**. TM stands for Thin Marsupial. This teat is often used for out of pouch macropods but has also been used successfully on small furred wombat joeys. The TM teat is longer than the MTM teat.



© Wombaroo Food Products (54)

To see the range of latex teats by Wombaroo go to their website www.wombaroo.com.au.

Making the hole in a teat:

Latex teats do not come with the hole already in them, so you will need to carefully make a hole in a teat before you use it. The hole needs to be very small so that the joey does not get the milk flow too fast which can cause inhalation pneumonia. However, if the hole is *too* small, excessive sucking will quickly weaken the tip and the end will blow out. The hole should be large enough for milk to drip out slowly, when the bottle is held upside down.

- With a sharp pair of nail scissors snip the top of the teat, about this size -.
- Push a match stick up through the teat. The teat will stretch and snap to accommodate the match; push match all the way through. Ensure you are using normal sized matches and not the jumbo ones!
- Use a very hot needle and push it through the top of the teat.

Changing teats:

Teats should be changed regularly as joeys often chew on the teat and holes become too big. Also, after time, the latex starts to break down and the teat becomes soft and squishy. Ensure that you are continually replacing old or damaged teats.

To prolong the life of latex teats store them in a dry place, away from light. An air-tight container is a good place to store teats.

Teats can be purchased through most veterinary clinics and produce shops.

bottles

Bottle choice is really of personal preference to each carer. There are two types of bottles that can be used; glass or plastic.

There are many different types of glass and plastic bottles that can be purchased from most veterinary clinics and produce shops. Most plastic bottles have a graduation scale on the side for ease of use.

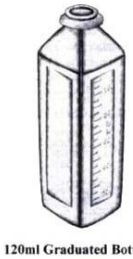
Plastic bottles can often get a build up of protein so you need to scrub them well after each use (see **utensil hygiene** for more information).

Bottles, both plastic and glass, that have been obtained for other purposes can also be used (environmentally friendly recycling!).

For example:

- **Food colour and flavouring** glass bottles can be used for small joeys (as most colour and flavouring bottles are only small).
- **Hair dye plastic bottles are ideal**. They are generally the same size as the plastic bottles made specifically for bottle feeding orphaned animals. Of course, use your common sense and ensure that the bottles are cleaned thoroughly before use. Allow the bottles to sit in a dry place for several days before use; this will eliminate any chemical smells.

Plastic bottle purchased through Wombaroo Food Products



© Wombaroo Food Products
(55)

© Linda Dennis
(56)

Glass bottle purchased through Australian Wildlife Supplies

bottle feeding

There is definitely an art to bottle feeding a wombat joey - it isn't always as easy as you may think. Not all joeys take to the bottle easily and it may take a while to get the joey used to the new "human mum" feeding technique.

The best way to feed a new joey is while it is still safe and snug in the pouch – this will give the joey a sense of security while feeding.

To feed a furless or just furred you will need to keep the whole body enclosed in the pouch with only its snout exposed. Cover the wombats eyes by keeping the pouch material over its eyes or by wrapping your free hand around its face - this will help to keep the joey calm. Also use this feeding technique on a larger joey that has just been received into care.

© Linda Dennis (57)

© Linda Dennis (58)

You will find that as the wombat gets comfortable and gets to know you as its new "mum" you will not have to cover them up as much; and larger joeys may even try wiggling out of the pouch altogether and will feed while lying in your lap.

In the wild a wombat joey "pumps" at the mother's pouch wall and this stimulates milk flow. An orphaned joey may also make this pumping motion when it first comes into care. An older joey that is pumping may be difficult to feed as legs tend to get in the way! To feed a pumping joey wrap it tightly in its pouch and then sit on a chair with your legs tucked up in front of you. Place the joey, in its pouch, inside the V of your lap and restrain it by tucking in your legs in further (so your ankles are close to your bum). This will make it nice and snug and the extra restraint should keep the joey from pumping.

There is no strict feeding positioning for a wombat once it has been accustomed to being in care, as each animal is totally unique and each has a preferred feeding position. In a natural environment an emerged wombat joey may lie on its side to drink from the pouch while its mother is also on its side (as witnessed in this photo of a hand-reared wombat with its wild joey) – so maybe this is a favoured position? Experiment different feeding position with the joey until you can see which position is favoured by the individual in your care.

Hand-reared wombat mum feeding her wild joey (59)
© Shirley Lack

Remember! do not place a joey directly on its back while feeding as the milk may end up being inhaled, causing inhalation pneumonia (see **the veterinary guide** for further information).

© Linda Dennis (60)

Ensure that you keep the bottle at an angle that keeps the teat full of milk all the time. By holding the bottle too low the joey may gulp air which will result in colic (see **the unwell joey** chapter for further information) and may cause a painful and distended belly. Make sure that you don't hold the bottle too high either, so that milk rushes through the hole in the teat. You want the joeys sucking motion to draw the milk through the teat, not gravity.

Feeding a joey should never be rushed. The action of sucking on the bottle not only feeds the joey, but also gives the joey a feeling of security.

In the wild a joey will have the teat in its mouth most of the time and will even suckle without receiving milk – kind of like a dummy (see **dummies** in this chapter for more information) – the joey takes great comfort from the suckling action.

Generally, a wombat joey should take between 15 minutes and half an hour to feed. Each animal is individual however, so some may take longer or less time to finish the bottle.

syringe feeding

Furless and just furred joeys can sometimes have problems feeding from a bottle and teat. An unwell joey may also have difficulty with feeding from a bottle and teat, especially if they are lethargic and don't have the energy to suck properly.

For these joeys, syringes can be used. The best types of syringe to use are made of glass. Plastic syringes are prone to sticking and this often results in an influx of milk flooding into the mouth as the syringe stem is pushed through the canister. This can result in inhalation pneumonia.

Glass syringes flow very smoothly, and you will often find that the gently sucking from a small or unwell wombat will be enough to move the stem of the syringe through the canister without having to push it.

The syringes come in a range of sizes which is great for different sized animals. The syringes below are 20ml and 2ml.

© Linda Dennis (61)

Bush Baby teats

© Australian Wildlife Supplies (62)

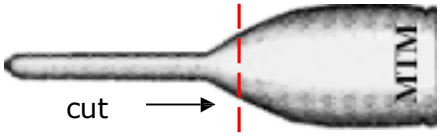
Bush Baby syringe teats are ideal to use when syringe feeding. They are made specifically for this purpose. The chance of the teat slipping off the syringe nozzle is greatly reduced.

Bush Baby teats and glass syringes can be purchased through Australian Wildlife Supplies.

A normal latex teat can be placed over the syringe nozzle as shown in the photo at right. Push the long part of the teat over the nozzle; the remaining part that would normally be fitted over a bottle can be pulled up over the canister of the syringe.

Using this method is ideal as it will ensure that the teat does not slip off the syringe and become lodged in the throat of the joey.

© Carol Pullar (63)



© Wombaroo Food Products (64)

Alternatively, cut the teat end from the portion that you would normally fit over a bottle. You need to ensure a tight fit over the nozzle so that the teat does not slip off and get caught in the joey's throat. You will also need to make sure there is enough teat left to get into the mouth of the joey.

Use the same feeding technique when using a syringe as with bottle feeding. Keep the joey securely wrapped in its pouch and only expose the snout. Cover the joey's eyes with your free hand which will help keep a tiny or new-into-care joey calm.

milk feeds a day

Remember! do not feed a joey that has just been received into care directly from a rescue until it has been warmed first (see **temperature** in this chapter for more information). Ensure that you warm the joey slowly – it should take approximately 3 hours for the joey to reach the desired temperature.

- **3.5 months / around 250 grams**. Feed every 3 to 4 hours around the clock – this means day *and* night (see **dedication** in this chapter for more information). Feed the joey while it is on a heat source as it will not retain heat for long when removed.
- **4 months / around 380 to 400 grams**. Feed every 4 hours around the clock. Feed the joey while it is on a heat source as it will not retain heat for long when removed.
- **5 months / around 750 to 800 grams**. Feed every 4 to 5 hours. The midnight feed is not required, however the first feed should be around 6am and the last around 11pm. The joey can be moved off the heat source to feed as it will retain its body temperature for short periods.
- **6 months / around 1 to 1.5 kilograms**. Feed as per 5 month. Joey will probably not require a heat source at all at this age (see **temperature** in this chapter for more information).
- **7 months / around 2 to 2.5 kilograms**. Feed every 6 hours.
- **8 months / around 3 to 3.5 kilograms**. Feed every 6 to 8 hours.
- **9 to 11 months / around 3.5 to 6.5 kilograms.** Feed every 8 hours.
- **12 to 15 months / 7 - 19 kilograms.** Feed every 12 hours. Joey should be weaned during this period.

Remember! to clean up any milk spills from joey or the makeshift pouch. If the pouch becomes soiled with milk, wee or poo you should change the pouch immediately. Soiled pouches and fur may cause bacterial infection.

The information listed above is a guide only. Keep in mind that each individual animal is different and you should adjust your bottle feeding regime accordingly.

utensil hygiene

A good hygiene system - for joeys of all sizes – will help keep the joey disease or illness free. If good hygiene practices aren't adopted a joey can quickly become ill with bacteria infections; for example, thrush, which can do nasty stuff to the insides of a wombat joey.

It is important that you always ensure you have good hygiene practices and thoroughly clean bottles, teats and other utensils after every feed.

Following are recommended steps for a properly cleaned equipment, etc.

- **Rinse bottles, etc, under cold water first**. Cold water stops the protein setting and results in a cleaner bottle (Dooley, 2004).

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- **Wash bottles, etc, using hot soapy water** - a simple washing up detergent will do, however Dettol Hand Wash has good results. Hot water is recommended as it breaks down the fat component and bacteria that builds up on the bottle walls. (Dooley, 2004). The use of a bottle brush is ideal as it scrubs away gunky build up, especially in the hard to reach bottom of the bottle. Wombaroo milk formulas are particularly thick and bottle cleaning will need extra attention if this product is used.
- **Thoroughly rinse bottles after washing to remove detergent**. If using antibacterial agents, such as Dettol Hand Wash, any left over residue may build up and result in loss of gut flora (which may cause diarrhoea).
- **Allow bottle to air dry before using again**. Bottles that are still wet may result in bacteria growth.

When feeding a furless or just furred joey it is essential to ensure your bottles are spotlessly clean. As mentioned in other sections in this chapter a joey of this size has a weak immune system and the gut cannot tolerate introduced bacteria. It is recommended that you sterilise the bottles after each feed.

Sterilisation is easy - all you need is salt and water. Place the salt in a large heat proof bowl and add water. You want enough salt to be able to taste it without being too overpowering.

Place the bottles, teats, utensils etc, into the bowl and place in the microwave. Heat on the highest setting for 15 to 20 minutes. You can also sterilise bottles, etc, with just plain boiling water, however you will need to boil the equipment for at least 30 minutes at 100^{o} Celsius to kill stubborn bacteria. If you don't have a microwave you can sterilise equipment using the same technique on the stove top.

The use of chemical sterilisation is not recommended for use in wildlife care so much any more - however, it is a personal choice for each carer. The reason it isn't used as frequently as in the past is that many carers believe that a build-up of the sterilisation formula can result in loss of gut flora in the joey's gut – which of course is not good and may cause illness.
If you are going to use a sterilisation mixture, such as Milton's, ensure that you rinse thoroughly after sterilisation.

dummies

In the wild a wombat joey will have the mother's teat in its mouth most of the time and will suckle even when there is no milk flow. This is especially the case for furless or just furred joeys as their lips are fused together and they are permanently attached to the teat.


© Sandra Stewart (65)

As with a human child, an orphaned wombat joey can derive great comfort from a dummy. An anxious joey will benefit from being offered a dummy as it will refrain from sucking other bodily bits, such as cloaca or testicles, which can result in damage to those areas.

For a dummy use a latex teat without a hole cut in the end.
If you use a teat with a hole the joey will suck in air and will develop colic (wind). The joey may take a while to get used to the teat, however if you persevere the joey should accept the dummy.

Not all joeys will accept a dummy. If a joey truly doesn't seem interested after attempts at using the technique, then it is up each carer to assess the individual and decide whether to proceed with the dummy.

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After each bottle place the dummy teat in the joey's mouth and check back 10 to 15 minutes later. If the joey has rejected the teat, insert it into the mouth again and continue this at intervals throughout the day.

Pin the teat to the joey's makeshift pouch so that it doesn't end up underneath the joey. Once the joey has become used to the dummy it will also be able to find the teat easily. Ensure that you place the pin on the outside of the pouch.

weaning

The weaning process of a wombat joey begins when it starts to take solid food. Contrary to popular belief, weaning is not the act of cutting out the milk formula *altogether*, but is a slow process that begins at approximately 8 months of age when the joey becomes more and more interested in solid food stuffs.

The Macquarie Dictionary describes weaning as:

> *To accustom (a child or animal) to food other than its mother's milk.*

In most (not all!) situations you will find that the joey will begin to wean itself off milk. For example:

> *You are feeding an 8 month old joey (3 to 3.5 kilograms) four bottles a day. The joey is becoming more interested in grass and nibbles regularly at the offerings you supply. Every morning the joey readily accepts its first bottle and then tucks into some grass. The joey used to also love its second bottle of the day, but over the last week or so, it has become disinterested and only likes half of it.....*

This is an ideal time to start the weaning process. Instead of giving the joey the full quantity it normally would take, cut that second bottle down to the amount it has been interested in over the last week. Follow this process until the joey is fully weaned, which should be roughly between 12 to 15 months of age.

Remember! that each wombat joey is individual and you will need to use unique weaning processes for each one.

Not all joeys will wean themselves – some are just far too fond of milk! For joeys like this, use a similar weaning process to the self-weaning-wombat, but be very gentle. In other words, do not enforce a strict weaning regime or it is likely that you will end up with a distressed joey. See **signs of stress (or distress)** section in this chapter for further information.

toileting

There is little known on how a wombat mum toilets its joey while it is in the pouch. A macropod, for example, will bend over and lick the cloaca of an in-pouch joey which stimulates the joey to pass wee or poo (which the mother consumes). It is considered that the position of the wombat's pouch - which faces backward - would make it difficult to perform this technique.

Bob Cleaver of Wombat Rise Sanctuary in South Australia captured this fantastic shot of a mother Southern Hairy-Nose Wombat and her in-pouch joey urinating at the same time. So, maybe this is how it's done in the wild? When mum toilets the joey pokes its bottom out of the pouch and toilets at the same time?

© Bob Cleaver (66)

However, even without the knowledge of how a wombat mum toilets its joey, it is still recommended

that you toilet a furless or just furred joey before or after each bottle feed - purely for hygiene reasons. A joey that is allowed to lie in its wee or poo may develop illness or disease.To toilet a joey you need to move it into a position where its bottom is poking out of the pouch (to prevent soiling the pouch liners) and gently stimulate the cloaca with a soft, preferably damp, cloth.


© Carol Pullar (67)

Not all joeys will tolerate this technique however, and may respond better to gentle pressure between the cloaca and the tail.

There are several methods that can be used to toilet a joey:

- **Chux wipes are ideal** as they are ultra absorbent and soft on fragile cloacas. Cut one chux (or equivalent product) into four pieces for a handy sized cloth. Have a bowl of warm water at hand to rinse any wee or poo off the cloth. Chux clothes are the environmentally friendly option!
- **Toilet paper or tissues** can also be used, however you need to ensure that the product you choose is soft so not to cause irritation to the skin in and around the cloaca.
- **It is not recommended that you use paper towels** as they are too rough and may cause irritation to the skin in and around the cloaca.

Remember! you only need soft, gentle rubbing to stimulate the joey into toileting. Do not over stimulate the area as this may result in a bowel prolapse*. If the joey has not passed wee or poo within 30 seconds - or is not showing signs that it is about too (cloaca opening and closing) - cease toileting.

* *Prolapse, as described by the Macquarie Dictionary – a falling down of an organ or part, ie: the uterus, from its normal position.*

In the wild, a furred joey will poke its little bottom out of its mothers pouch to wee and poo. Similarly, an in-care joey at this stage may also begin to toilet on its own accord, by poking its bottom out of the makeshift pouch. When the joey shows signs of self-toileting it is an ideal time to begin toilet training.

It is recommended that you continue toileting a joey until it reaches approximately 3 to 4 kilos. Each joey is different however, so use your judgement as to when to cease toileting and begin toilet training; some may not self-toilet until around the 6 kilo mark.

Remember! to immediately clean up faeces and urine from the joey and the makeshift pouch. If left, the joey may become ill with a bacterial infection.

Toilet training:

- **Place a layer of newspaper or a box of kitty litter** in the area you would like the joey to toilet. Hide the spot with leafy branches, enclose it in a box (open at one end) or place a "lean-too" over the area as the joey will want to be hidden while toileting.
- **After each feed place the joey in the toilet spot** and gently stimulate the cloaca. You may need to do this a few times before the joey starts to use the spot on its own.
- **When the joeys smells wee or poo in the toilet spot it will continue to use that area**. Wombats are clean animals and prefer to use the one spot over any other area, so make sure you choose the toilet spot carefully.
- **If you are using newspaper, once it is wet remove the top** wetter layers and place at the bottom. This will keep the smell in the spot which will encourage the joey to use it.

- **Regularly change the newspaper or kitty litter** so that bacterial infection does not occur. Always leave a few pellets of poo to encourage the joey to continue using the spot.

wombat joey poo

As a wombat joey grows, its poo consistency and colour will change.

Factors relating to poo change include:

- **age** of joey
- **establishment of gut flora**; and
- **solid food** intake.

Following is a guide of how your joey's poo should look during the different age stages. Proper husbandry and management (ie: introducing solid food at the right time, etc) will impact on poo change. Poo will become firmer as gut flora develops.

The poo-meter:

- **3.5 months / around 250 grams.** Poo is almost liquid at this stage and will be yellow in colour.
- **4 months / around 380 to 400 grams**. Poo will be firming to a custard consistency and will still be yellow in colour.
- **5 months / around 750 to 800 grams**. Poo is getting thicker and will resemble toothpaste in consistency and will be yellow in colour, although darkening.
- **6 months / around 1 to 1.5 kilograms**. Poo can still be a toothpaste consistency but smaller "lumps" will be forming if dirt is being provided. Colour is yellowy green. Joey may be starting to stick its bum out of the pouch to poo.
- **7 months / around 2 to 2.5 kilograms**. Poo should be starting to form soft pellets. Dried grass should be offered around this period, although the joey will only be experimenting with it and won't be eating a large quantity. As a result the poo will be darkening to an olive green colour.
- **8 months / around 3 to 3.5 kilograms**. Poo should be pellets, although may appear to be softer than at the 7 month stage as fresher grass can be offered (fresh grass can often equal softer poo). Poo should be a dark green colour.
- **9 to 11 months / around 3.5 to 6.5 kilograms.** Poo should now be the characteristic squarish pellets. The joey should not need to be toileted by the carer. The joey will want to poo in hidden spots, so ensure you have hideaways available in the wombat's enclosure (see **toileting** for more information).
- **12 to 15 months / 7 - 19 kilograms.** Poo will be square and the wombat may start to display poo in elevated areas (see **wombat poo** in **general biology and development** for more information).

Wombat joeys regularly eat their own poo so don't be alarmed if the joey does not poo when it is toileted. There are normally tell tale signs of this however – poo smudges around lips, in the mouth and up the nose are a good indicator. Pooey breath is another!

Joeys tend to regularly get poo up their noses. See **nose gunk** in this chapter for more information.

Poo from a 13 month old wombat (68)
© Linda Dennis

inside a wombat's pouch

Inside a wombat's pouch a thick waxy substance is discharged from the skin which coats the entire pouch lining. This substance, which is reddish brown in colour, is the natural lubrication which keeps a pouch bound joey's skin soft and supple.

A young wombat will also get this waxy substance in the pouch – so don't panic if you see a joey with a red waxy pouch, it's not a bad thing! The amount of lubrication developed is individual to each wombat; some may be very waxy while others may only produce a small amount.

If you are unsure or nervous at all about the amount of waxy build up in a joey's pouch, seek the advice of an experienced wombat carer.

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temperature

Bare-Nosed Wombats cannot tolerate high temperature and the use of a thermometer is essential when raising an orphaned joey. A joey will become heat stressed quite quickly and if the temperature is maintained damage caused by heat stress can be irreversible.

A wombat that has just been received into care must be warmed slowly. It takes approximately 3 hours to warm a joey to the correct temperature (Staker, 2001).

Temperature requirements are:

- **Furless or just furred joey** (under 600 grams) – 28 to 30° Celsius – NO HIGHER! *Joeys of this size cannot regulate their own body temperature and must be placed on a heat source.*
- **Developing fur** (over 600 grams) – 28° Celsius – NO HIGHER!
  Joeys of this size are just starting to regulate their own temperature, however there should still be a heat source available. Place the heat source so that the joey can move away from it if it wants to.
- **Furred joeys** – can regulate their own temperature and should not need a heat source. However, a sick or injured joey may need to be kept warm - 28° Celsius – NO HIGHER!

heat source

There are several good options for keeping your joey at the appropriate temperature. Most options create a dry heat however, so a furless or just furred joey will need to be lubricated daily (see **lubrication** for more information).

It is not recommended to try and re-create the humid environment that a joey would receive within its mothers pouch (without a humidicrib) as bacterial infections may occur.

- **A heat pad** is one of the best and most easily accessible options. There are many heat pads available on the market that are made specifically for animals. Check your local pet supply store for options. Alternatively, a head pad for a water bed can be used.

  To create a snug bed for a furless or just furred joey, partially fill a wine bladder with warm water and place on top of the heat pad (George et al, 1995). As the joey becomes more adventurous make sure that you remove the wine bladder as it may

develop holes from curious scratching or biting – electric heat pads and water don't mix!

- **Hot water bottles** can be used for emergency situations, however as the bottle does not hold the required temperature for long periods it must be constantly checked. Only hot water from the tap can be used - water from a boiled kettle may scald the joey or cause heat stress. Hot water bottles must be wrapped in a towel or piece of cloth and placed between the inner and outer liners in the makeshift pouch.

- **Wheat bags** can also be used for emergency or short periods. Ensure that you do not overheat the bag; wheat bags have been known to combust if too hot. Tests of wheat bags suggest that combustion may occur as the wheat content breaks down and deteriorate (Dooley, 2004). Cheryl Dooley in Macropology recommends:

  - Heat the bag for a maximum of three minutes.
  - Do not reheat the bag until it has completely cooled (around 2 hours or more after initial heating).
  - Discard the bag if you observe problems, ie: burn marks, weird smells, etc.
  - Cool the bag well before storing.

  As with a hot water bottle, wrap the bag in a towel or cloth (do not make the wrapping too thick – such as, with a blanket) and place between the inner and outer liners of the makeshift pouch.

- **A humidicrib** is another option to heat a furless or just furred joey. A humidicrib keeps a joey at the correct temperature, but also creates a humid environment.

  However, humidicribs are designed to be used in a room that has constant temperature (ie: is air conditioned) and therefore are often difficult to manage in a normal care situation. It has also been recorded that it is difficult to set a humidicrib low enough for the desired temperature of 28 to 30° Celsius (George et al, 1995).


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  If a humidicrib is being used the joey should be removed at just after the just-furred stage as the joey is growing more fur. Keeping the joey in this environment too long may cause delays in growth.

  Humidicribs are difficult to source. If you choose to use this method try contacting your local hospital and tell them you are looking for a humidicrib to raise orphaned Australian native marsupials. Hospital often discard humidicribs that may have slight problems that make them illegal for human use, but may only require a small fix to work efficiently.

Remember! that under heating a joey is as detrimental as over heating. Over heating can cause severe heat stress and can kill a joey - under heating could cause pneumonia and this can also kill a joey.

Remember! a marsupial joey that is being raised on Biolac 100-G can begin to regulate its own body temperature from 500 grams and therefore may not require a heat source. Use a thermometer to ascertain the joey's temperature and use a heat source only if the joey is not sitting comfortably at 28°C.

skin lubrication

In the wild, the pre-emerged wombat joey lives in a humid environment – the mother's pouch. In the pouch a thick waxy substance is produced, and the temperature is regulated creating a humid environment that keeps the joey well lubricated. Trying to reproduce a similar humid environment while in care is not recommended as bacterial infections may occur, so alternatively the joey needs to be lubricated on a daily basis.

A furless joey will need to be lubricated over the entire body otherwise the skin can become red, raw, cracked and dry (ensure that you avoid the eye area and nostrils).


© Sarah Trembath (71)

A just furred joey will need to have the fleshy bits lubricated, such as the paw pads, nose and sometimes the cloaca.

Once the joey is quite active and the paw pads are darkening, lubrication is not normally required. However, you should constantly check for dry or damaged skin and apply lubrication when required.

There are several options available and it is up to each individual carer to find the right product for them and their wombat charges.

Some topical options are:

- **Eucerin cream** is a wool fat cream that has no additives. It is a lot easier to spread than the other wool fats. You only really need to use it once a day at the most and sometimes every second day. Obviously don't use it too thick or the joey will get blocked pores. (pers. comms. C. Letica, 2005).
- **Olive Oil** is another all natural alternative to use as a topical application. Although this can work it does tend to leave a sticky residue on makeshift pouches which results in them needing to be washed more often.
- **Paw Paw ointment** is an ideal topical application as it is a totally natural product and will not harm the joey if it is licked off. It is a thick ointment and is only needed sparingly. Heating the ointment before applying (being sure not to overheat and cause burns) makes the ointment easier to spread.
- **Sorbolene Cream** can be a bit gluggy on the skin and doesn't always absorb well, especially in cold climates, but does work efficiently if warmed first.
- **Sorbolene and Glycerine Cream** has always been considered as a no-no as it was thought that glycerine was used as a heart starter in human medicine (after cardiac arrest, etc). However, Anne Fowler has recently advised that it is ***Nitroglycerine*** cream that is the heart starter which is only available on prescription. Anne has respect for glycerine as it is a basic energy building block for herbivores such as cows and sheep, and as wombats are also herbivores Sorbolene and Glycerine can be used with success.

Topical applications that should be avoided:

- **Baby oil** is a real no-no. The mineral content of this application can make a joey very ill when absorbed through the skin or if it is licked off.
- **Petroleum Jelly** is a petrol based product and the use of this ointment can make a joey very ill if absorbed through the skin or if it is licked off.

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Oral treatments that can be mixed with normal milk bottles:

- **Canola Oil** is an oil that has been used for many years, especially for constipation. It can also be used as an additive to milk bottles for skin lubrication. Only a few millilitres per bottle is needed.
- **Megaderm** is an exceptional product and if used according to instructions (on the bottle) a joey will not need as much topical lubrication as with any other oral treatment.
- **Olive oil** is used on domestic pets with great success. Olive oil is (normally) chemical free and is gentle on a wombat's gut system. Olive oil, when given internally, can also add sheen and quality to the wombat's coat. Only a few millilitres per bottle is needed.

nose gunk

The environment within a wombat pouch is warm and humid, and in most cases it is difficult for carers to keep wombat joeys in the same humid condition. The makeshift pouches that joeys are normally housed in are somewhat dryer and as a result wombat joeys, particularly the furless or just furred, always seem to have "gunky" noses and it is imperative that noses are constantly checked (say, after each bottle) to ensure that there are no obstructions.

"Gunk" can include mucous, fluff, fur and poo (see **wombat joey poo** in this chapter for more information).

To remove the gunk you should use a non sharp item such as a pair of plastic tweezers or a hair bobby pin (pull the pin ends apart so one prong can be used) and while the joey is restrained carefully insert the tweezers and remove the gunk. For those of you who don't mind getting "hands on", use a finger nail to remove the gunk (pinkie finger is good!). Never leave gunk to build up in the nose as the joey will not be able to breath - they don't tend to breath through their mouths as humans do if their noses are blocked.


© Linda Dennis (72)

Metal tweezers are not recommended as most are quite sharp and if the joey struggles damage to the nasal cavity may result.

Older joeys tend to unblock their noses themselves by snorting and blowing out the content, but you should always check just to make sure. **Beware** – you may end up with snot on your sofa!

signs of stress (or *distress*)

Many people associate a "freaked out" animal with stress, however stress responses can also be a good thing. For example, a stressor of pain can have the stress response of a limp, which helps the body part heal (Bryant, 2004).

The word to better describe an anxious or "freaked out" animal is ***distress***. Distress is otherwise described as anguish, agony, grief and misery – all things we want to avoid at all costs.

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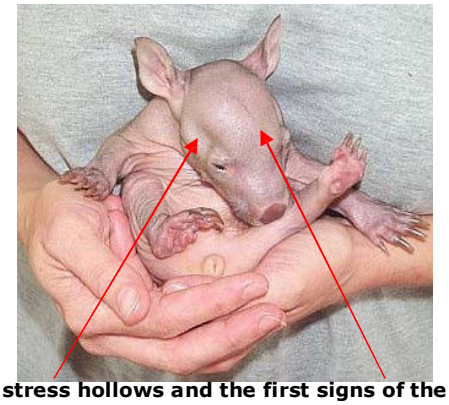
Signs of stress in a wombat joey include:

- **Gnawing teeth** (or grinding)
- **Hiccups** (although some joeys do hiccup after a bottle or when excited, eg: during play time).
- **Stress hollows & the death cross** in temples
  These are more visible in furless joeys, however to check a furred joey you can gently probe the area behind the eye and on the top of the head with your finger to feel if there are indents.
- **Sleeping curled up tightly into a ball** with legs facing downward and head tucked under body (*a stress free wombat should sleep curled up on its side or on its back with legs in air!*).



stress hollows and the first signs of the death cross are evident in Keti – urgent action is needed when distress is this severe
© Linda Dennis (27)

- **Signs of heat stress** are bright pink pads on the soles of the feet.
- **The Death Cross** – indents in the shape of a cross on the top of the head indicate severe stress – and that death is near.

stress hollows and the death cross

This image shows what stress hollows in a fully furred wombat look like (73)
© Stephanie Clarke & Wayne White

Stress hollows and The Death Cross (like those shown in the photo above) are one of the final signs to show in a severely distressed joey. The longer a joey is kept in this condition the less likely the carer will be able to pull the joey out of its distressed state. If the joey has deep indents in the shape of a cross on the top of the head it indicates that death is near – URGENT ACTION IS REQUIRED.

One of the first thing you can do to reverse this condition is to give sub-cutaneous fluid (see **sub-cutaneous injection** in the **hydration** chapter for more information). More than one sub-cut session may be required before the joey is back to peak condition.

Then the individual joey will need to be assessed to determine the reasons for its distress. In Keti's case it was found that increased physical contact resulted in a much more contented joey.

Remember! that joeys are babies and need nurturing. A joey that is not nurtured will continue to be distressed. Nurturing is an important part of raising any marsupial joey and includes cuddles and close interaction. There will be time at later stages of the joey's growth to start the "de-humanisation" process and this is when you should slowly withdraw from the individual.

stressors

There are many things that can distress a wombat joey, and unfortunately they are often things that normally occur in our day to day lives.

Stressors include:

- **Loud children** even if they're playing happily and aren't intentionally being frightening, the loud noises that children often make can distress a joey.
- **Over handling**, especially by other people (including children). A wombat joey prefers one "human mum" (sometimes two, eg: a spouse or partner that can help raise the joey). A wombat joey will bond quite strongly with its carer and too many people with "hands on" may cause deep distress.
- **Incorrect sizes in makeshift pouches**. The pouches should not be too small or too big or the joey will not feel secure. Aim to use a pouch that enables the joey to feel snug and secure but still has free movement in.
- **A change in carers** as the bond between a joey and its carer is very strong. It is advisable - wherever possible - for a wombat joey to be raised by one carer throughout its whole time in care.
- **Dogs and cats** are the natural predators of most native animals and the fear of these animals is usually instinctive in native animals. Keeping a joey near a dog can frighten it so much that it can die instantly or over a prolonged period.
- **Loud music and noises**. The deep booming of music and the slamming of doors, etc, can reverberate right through a joey which could lead to severe distress.
- **Heat stress** can lead to severe distress in a wombat joey as wombats cannot tolerate high temperatures (see **temperature** in this chapter for more information). Keeping a joey too warm or too cold can cause major illness.
- **Strong unnatural smells** such as air fresheners, strong fabric softeners, cigarette smoke, etc. The wombat's sense of smell is highly advanced and is the primary sense used.
- **Enforced abnormal biological rhythms**. For example, forcing a nocturnal animal into a diurnal lifestyle (Bryant, 2004).
- **Overcrowding can cause distress** and can also lead to aggressive/submissive behaviour. Carers need to set limits on how many animals are in care at one time. Limits need to be placed on carer capability and area capacity.
- **Raised blood pressure** in a severely stressed joey can lead to prolonged distress and can be fatal if you cannot pull the joey out of its distressed condition quickly.

When stressors are severe and not remedied immediately, stress responses can be detrimental. Raising a wombat joey may require a total shift in the way you would normally live. It takes total dedication to the joey for you to be able to make these changes in your life.

a stressed wombat (74)
© Linda Dennis

a contented wombat (75)
© Linda Dennis

These photos show the same wombat, Keti. The first photo was taken a few days after being received into care and the second photo was taken several weeks later.

importance of sunlight

Most living things on this planet need sunlight in order to grow. Access to *filtered* sunlight is an essential component of raising an orphaned wombat joey. Wombats cannot tolerate high temperatures so direct sunlight during the hottest parts of the day must be avoided.

Early morning and late afternoon are the best time to get your joey out into the sun, but only if the temperature is under 28°C (see **temperature** section in this chapter for more information).

The joey does not necessarily need to be in direct sunlight to benefit from the UV rays. A shady spot, say under a tree or beneath a verandah roof, is perfectly acceptable and the joey will receive enough UV to stay healthy.

Joeys start to become active out of pouch at around the 3kg to 3.5kg mark (around 8 months of age). This may be a good time to get your joey outside for play times and for short "wombat walks". Choose a sheltered area and sit with your joey while it takes time to sniff the roses and munch on grass.

Allow the joey is move back into its pouch, or to you, when it wants too.

Keti and Alu on a late afternoon "wombat walk" (76)
© Linda Dennis

A furless or just furred joey will also benefit from sunlight, however you should only expose the head of the joey and for short periods at a time. Joeys in the wild are used to living in a dark warm pouch - if you leave the joey exposed for too long it will become distressed.

Ensure that you monitor the joey constantly while being in the sunlight - any sign of discomfort in the joey and it should be moved into a more shaded area or returned to the pouch. If you keep the joey in the sun too long it may develop a skin allergy - red raised skin or swollen eyes may need an antihistamine injection to remedy.

the benefits of buddying

In the wild a wombat joey shares a very strong bond with its mother and an orphaned wombat joey will share a similar bond with its "human mum". A joey that is raised on its own may demand attention most of the time, even while it is sleeping.

A single joey that is not offered the company and nurturing it craves may result in a very distressed joey. If the joey manages to escape from its enclosure it will seek out its "mum" and if he / she can't be found the joey will find the nearest object that smells like "mum" and will curl up and fret itself to sleep.

If joeys are raised in pairs or more, the craving for human company isn't as strong as the joey will have its buddy to depend on. Although the joey will still want - and should receive - cuddles from "mum" it will not stress when not in continuous contact.

© Linda Dennis (77)

In most situations a joey that has been raised on its own will have a tougher time assimilating into the wild than a joey that has been raised with a buddy. It will take a lot longer for the joey to finally leave home and become truly wild. This may result in a stressed wombat during the release process.

However, not all joeys tolerate being buddied. Wombats have individual characters and just like humans not all wombats get on with each other. It's uncommon but still possible that you may receive a joey that does not fair well with being buddied, and if this is the case it may be better to raise the joey on its own. This will be a tougher job for the carer and much dedication is required to raise the joey so that it does not crave human company once it has been released.

play time

Most baby animals like to play, and wombats are no different. Play time is probably one of the most rewarding times for a wildlife carer, as a joey in full play mode is an absolute delight.

Wombats have a period in the day - sometimes two - where they tend to go a little mad (most marsupial joeys do) – this period is affectionately known as "Happy Hour" of "Funny Five Minutes".

This is the time when your wombat will want to play - with you, its "mum" – and this activity should be encouraged.

Photo at right: "going a little crazy" - during this little wombat's funny five minutes she moved so fast the camera wasn't quite quick enough!

© Linda Dennis (78)

Happy Hour for a wombat is:

- **Running flat out** and narrowly missing objects.
- **Stopping suddenly** and performing a quick 180° turn.
- **Bum poking** up in the air.
- **Tossing head** from side to side,
- **Nose poking** up in the air.
- **Lying flat on belly** and grinning madly (baring teeth).
- **Jumping into the air** or onto objects (such as "mum").
- **Nipping** "mum" (beware – you will receive bruises during play time!).
- **Rolling over** and playing dead.

© Linda Dennis (79)

- **Flicking bum** as if to say "bugger off".
- **Digging** at the dirt, carpet or your legs – whatever is available!

This information is adapted from Australian Native Mammal Care – Common Wombat. **Sandra Stewart**.

Remember! ears down means a wombat is feeling cranky or "a-little-bit-crazy". Prepare for bites!

climbing wombats

© Carol Pullar (80)

Wombats are really very good at climbing – upwards! However, they are not so good at getting down again. If you take on a wombat joey you need to ensure that your house, or the enclosure that you keep the joey in, is safe and that there are no obstacles that the joey can climb and injure itself on.

It is recommended that you don't allow the joey free and roaming access to your home, especially when you are not nearby. A wombat is a very determined animal and a wombat joey will want to find you – its "mum". If there is an obstacle in the way and the joey finds that it can't go under or around it, it will climb over the top of it. Coming down the other side is where trouble lies and joeys in care have been injured – including broken limbs - from falling off obstacles that they have climbed.

Keep your joey in a safe environment; a flat, solid walled enclosure is the best thing for you and your joey.

mischievous wombats

In **getting the joey settled** it states:

"It is important for any carer to realise that their home will not be normal for the initial stages of care. For a short time, the world totally revolves around the wombat!".

That wasn't totally true!

More realistically, your world will revolve around a wombat joey pretty much the whole time it is in care. A young wombat joey will take over your house (and heart) during play time (see **play time** for more information) and they love to make mischief.

© Linda Dennis (81)

© Linda Dennis (82)

If you like your house to look like a home from a House & Garden magazine then don't raise wombats! Wombat joeys will look for mischief – they will get in your cupboards (if you are silly enough to leave a door open!) and get in your drawers.

This is normal wombat joey activity and you cannot get mad at the joey. It will not understand your raised voice or a smack on the bum – you will only cause fright leading to a distressed joey.

Try to make your home wombat proof - to protect your things as well as to protect the joey from harm – and play time can be fun for you too.

destructive wombats

Sometimes wombats that have been raised in care don't always do what they are supposed to, when they are supposed to – return to the wild! – even with the most determined efforts of the carer.

Each wombat is totally individual and each one has their own unique character. Every once in a while you may raise a wombat that doesn't transition to the wild as easily as it should and would much prefer coming home for regular visits – like Fuddles, whose stories have been told in the case studies **the benefits of buddying** and **territorial aggression**.

Wombats with particularly "needy" characters (remembering that all wombats are determined) will not stop until they have gotten what they want, which is generally you.

This door was boarded up which was no obstacle to a determined wombat. You can see that the wombat dug up the concrete in an attempt to get inside (83)

Doors are no obstacle, and neither is concrete! Both will be dug through – and damaged – in the wombat's attempt to find you.

There is not a great deal that you can do about this but to have patience and wait it out. A wombat like this is going to need extra time to transition into the wild. It will happen - **but be warned** - you may get a damaged house in the process.

natural food and supplements while in care

A joey will start to take solid food at around 8 months of age.

Solid food stuffs can include:

- **Native grasses** such as tussock, spear grass, kangaroo grass and wallaby grass should be generously offered. Introduced grasses are also eaten. It is best to use grass from where the wombat originated, or will be released too. Kikuyu is not recommended as it can be poisonous in lush spells after dry conditions and can cause death (see **toxic plants** for more information).
- **Kangaroo Pellets** are an ideal non-natural food to offer. They are made specifically for Australian marsupials and have a host of vitamins and minerals included. Kangaroo pellets can be purchased from most farm produce stores.
- **Sorghum** (also known as Milo) is a very palatable hard grain that is ideal for wetter climates as it will not spoil if it gets wet. Green shoots from grain left on the ground are toxic and can cause illness (see **toxic plants** in **the unwell joey – a carer's perspective** for more information).
- **Completo horse food** by Barastoc is a good food supplement. It is highly palatable with lots of vitamins and minerals and acceptable for wombats.
- **Cop Rice** is another type of feed created for horses but can be used for wombats. There are many types of Cop Rice, the general purpose one may be the best choice and this is called Cool Condition. Cop Rice is made from rice and rice bran.
- **Other grains** developed for ruminants, eg Economix, can be offered, however you must ensure that the protein levels are not too high (under 12%).
- **Dirt**. A joey should be offered a considerable amount of dirt as this helps gut bacteria to form.

Food such as unsweetened muesli, rolled oats, carrot, lucerne, sweet potato, etc ,can be offered. Raw potato is not recommended it has little nutritional value. Unprocessed oats (from produce stores) are also not recommended as the husks can become embedded in the gum.

Carrots are not recommended in areas where baiting is carried out (carrots are dosed with 1080 and used in some areas to eradicate rabbits and marsupials).

© Linda Dennis (84)

As the wombat matures you should reduce the amount of supplement food and offer native food that is commonly found in the area where the wombat will be released, this is especially so if a hard release technique is used.

Try to offer a varied diet, including different types of grasses – wombats get bored of the same food every day too! (85)
© Linda Dennis

Ensure that there is always plenty of drinking water available, wombats don't drink often, but when they do they can drink a lot of water over several minutes. (86)
© Linda Dennis

chapter six

the unwell joey
a carer's perspective

© Linda Dennis (87)

Detailed information on the diseases and illnesses of Bare-Nosed Wombats, and treatments thereof, are covered in **the veterinary guide** and a concise list of naturopathic remedies can be found in **the naturopathic guide**.

A list of basic treatments for minor conditions can be found in **treatments for minor conditions** in this chapter.

Joeys can become unwell for many reasons including unclean bottle or teat, not enough dirt in the diet, eaten a weed, eaten the wrong kind of grass, the grass is too rich, distress, allergic reaction, etc.

This section covers what a carer can do to alleviate or treat a minor illness.

Remember! if you are unsure of what to do with an unwell joey seek veterinary advice immediately.

This is one area where your record keeping will come in handy. By recognising symptoms and then looking through your daily records you may be able to determine what is happening with your joey (see **keeping accurate records** in **raising orphaned joeys chapter** for more information.

This joey is suffering from bloat (88)
© Carol Pullar

signs of an unwell joey

Some signs to look for in an unwell joey:

- **Lethargy**. Take care that you don't confuse a sleepy joey with a lethargic one. The Macquarie Dictionary describes *lethargy* as a state of drowsy dullness or suspension of the faculties and energies; apathetic or sluggish inactivity.
- **Loss of appetite**. If your joey seems to be eating healthily one day but is disinterested the next, or over a prolonged period, it may indicate illness or distress.
- **Diarrhoea or any change in faeces**. Keep a record of what your joey's poo is normally like. A change in faeces consistency or colour may indicate either illness or distress. Your records may be able to give you a clue as to what is happening with your joey. See **increasing water intake during diarrhoea** in **hydration** chapter and **constipation** in this chapter for more information.
- **White gums**. Gums should be a healthy pink.
- **Cold mouth**. When you place a (clean) finger in the joey's mouth it should feel body temperature – neither hot nor cold.
- **Dull coat**. A wombats coat, although wiry and coarse, should have a sheen to it.
- **Wind**. Some wind is normal – we all pass wind from time to time! Excess wind, however, can indicate diseases such as gut thrush.
- **Teeth grinding**. Wombats do grind their teeth to some extent as their teeth continually grow (see **teeth** in **general biology and development** chapter for more information). Excessive and prolonged teeth grinding, however, can indicate distress.
- **Signs of pain** (contorted, hunched over or clenched or outstretched paws.)

It is most important for you to remember that diarrhoea should not be ignored. If the diarrhoea has not shown signs of improvement on the third day the wombat should be taken to a vet immediately.

You will need to try and work out what is causing the joey to feel unwell. Go over your daily records for the days just prior to the signs manifesting - there may be hints in behavioural change, decrease in milk intake, faeces change, etc.

A joey that is unwell may not be able to regulate its own body temperature so it is important to keep the joey warm, always keeping in mind the specific temperature requirements for wombats (see **temperature** in **raising orphaned joeys** for more information).

When a joey is unwell, keep fluids up. Unless the joey is refusing its milk do not reduce the amount as the joey needs the food to keep its strength. Increase the joey's water intake - or better still offer an electrolyte fluid such as Vitrate or Glucodine for added minerals. Aim to offer at least 10% of the wombat's weight in fluids over a 24 hour period.

signs of a recuperating joey

The signs that show a sick wombat is recuperating are:

- **Grooming**. A healthy wombat joey will groom daily.
- **Interest in surroundings**. The joey may seem to spark up and become interested in you and its surroundings again.
- **Pink gums** are a good indicator of a healthy wombat joey.
- **A shiny coat**, without oral treatments (such as olive oil).
- **Increased appetite**. If a joey is interested in food again you know you have a joey that is on the improve.
- **Weight gain**. This is a fantastic sign - a healthy joey should put on 100 grams a week.

allergies

There are many things in our human world that those living in the wombat world would not normally come across. So, it stands to reason that a wombat joey may develop an allergic reaction while in care.

Signs of allergies can include:

- **Red or hot paws**.
- **A rash** on the body.
- **Hot ears**.
- **Swelling around eyes** (this can be a reaction to sun exposure).
- **Sore mouth** (this can also indicate thrush).

This joey shows a mild skin allergy (note red skin) (71)
© Sarah Trembath

Use your records (see **keeping accurate records** in **raising orphaned joeys** for more information) to ascertain what may have caused the allergy and adjust your care regime.

Some causes may include:

- **Skin creams**.
- **Pouch lining**.

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- **Laundry liquids and softeners**.
- **Toxic plants** (see **toxic plants** for more information).
- **Milk product**.
- **Sun exposure**. Wombats cannot tolerate full exposure to direct hot sun and skin swelling may occur.

Remember! that a product such as a lubricant or milk formula may be used without problem in one animal but may adversely affect another – each animal is individual! Therefore it may be difficult to find the cause of the allergy and you may need to become a pseudo-investigator and delve deeply into your care routine. Once you have found the source of the allergy you need to try and eliminate the cause.

See **treatments for minor conditions** for information on basic remedies.

Remember! if symptoms do not subside in a couple of days the wombat may need an antihistamine injection administered by your vet.

bacterial dermatitis

All animals – including humans - have bacteria living on the surface of the skin and on the mucous membranes of the nose and in the mouth These bacteria do not normally cause problems, however if the skin is damaged (scratch, bite, etc) the bacteria can cause an infection leading to bacterial dermatitis.

Wombats are rough and tough critters and during play time it is not uncommon for them to bite and scratch one another. Usually play bites and scratches do not penetrate the skin, but as they grow older play time can become rougher and minor scratches may occur. Minor scratches can also be received from enclosure furniture such as logs. If the skin has been broken it may lead to bacterial dermatitis.

Wombat with bacterial dermatitis (89)
© Linda Dennis

Signs of bacterial dermatitis include:

- development of reddened skin
- sores, sometimes weeping or crusty
- increased itchiness
- dry skin, which is often thickened in the areas that have been scratched
- pimples
- lumps, blisters or ulcers on the body
- fur loss

Bacterial dermatitis can be very itchy and the symptoms will need to be eased. Paraderm Plus has been used successfully to treat the condition. It has a mild antibiotic which will help treat the bacterial outbreak, along with an antiseptic, anaesthetic and anti-inflammatory.

Prednoderm has also been used with success. See **treatments for minor condition** for more information.

Remember! if the joeys condition appears severe it is recommended that you seek veterinary advice.

colic

Colic, also known as gas, wind or bloat, is a condition that all marsupials can develop while in care. It is a build up of gas in the gastro-intestinal tract that can be quiet painful if left untreated. It can also cause major problems, such as a twisted bowel or bacterial infection, if the condition is severe.

There are many causes for colic and these include:

- **Sucking air** – allowing a joey to suck air through the teat can cause colic. If a teat is used as a dummy there should be no hole in the teat (see **dummies** in **raising orphaned joeys** for further information).
- **Incorrect food** – such as banana and cabbage.
- **Little or no exercise** – particularly after a bottle, joeys should be encouraged to exercise daily (obviously the amount of exercise depends on the age of the joey).

Symptoms of colic include:

- **Distended belly**.
- **Hunching**.
- **Stretching body**.
- **Contorting body**.

This joey is suffering from bloat (88)
© Carol Pullar

As with human babies it is better to prevent colic than to continually treat it. Use your daily records (see **keeping accurate records** in **raising orphaned joeys** for more information) to ascertain why the joey developed colic in the first place and amend your care regime to eliminate the cause.

See **treatments for minor conditions** for more information on basic treatments.

Remember! if the joeys condition appears severe it is recommended that you seek veterinary advice.

constipation

At times a joey may develop constipation and there are several factors for this, including:

- **Not enough water** in the diet.
- **Milk formula** is too thick.
- **Introduction of solid food** into the diet.
- **An obstruction**.

Constipation can be quite painful for the joey and it is important that the condition is treated quickly. If left untreated severe complications may occur, for example: a twisted bowel.

Following are some recommended treatments for constipation:

- **Ensure plenty of fluid is offered at all times** – prevention is better than cure.
- **Add canola or olive oil to the bottle**, only 2 to 3mls is needed per bottle. The bowel and the poo will be coated with the oil making the poo easier to pass. The oral

route does take some time to reach the bowel however, so use this option at the onset of constipation.

- **Give the joey an oil enema** using any of the oils listed above mixed with warm water. The water will absorb into the poo making is softer and the oil will coat the poo and the bowel making the poo easier to pass. Make sure that you are inserting the enema into the right orifice, the anus is to the rear of the cloaca.

See **treatments for minor conditions** for more information on basic remedies.

Remember! if the constipation is severe it is recommended that you seek veterinary advice.

cystitis

Cystitis, also known as Urinary Tract Disease, is inflammation of the bladder caused by a bacterial infection. Joeys in care often get the condition when they are not offered enough water in the diet.

Symptoms of this condition are:

- **Dark coloured wee** - dark yellow to orange / red
- **Highly concentrated wee** with a strong smell
- **Wee is in a broken flow** – a joey should wee in a continual stream, dribbles or spurts of wee may indicate cystitis.
- **Pain during urination** -shown by hunching over, hissing, etc

To clinically identify this condition a dip stick test can be performed to test the alkalinity levels within the wee. Catch the urine mid flow and using a dip stick test the pH. High levels of alkalinity (above 7-8) indicate cystitis.

To help ease this condition water intake should be increased. Vitamin C can also be offered, which reduces alkalinity.

Severe cases will need to be treated with antibiotics and penicillin. If left untreated cystitis can cause major problems with the kidneys.

See **treatments for minor conditions** for information on basic remedies.

Remember! if the joeys condition appears severe it is recommended that you seek veterinary advice.

diarrhoea

Diarrhoea in any marsupial is often a sign that something is wrong, for example: a bacterial infection or distress. It can also mean that the animal has eaten something bad, eg: a weed or rich grass, and has an upset belly.

Nevertheless, a bout of diarrhoea will compromise the joey and it should never be ignored. If diarrhoea is left unchecked the joey will lose energy and may become even sicker.

Many carers are confused about diarrhoea and are unsure exactly what is classed as diarrhoea – or scouring – and what is not.

Diarrhoea is when the poo is very watery and is ***uncontrolled***. Soft poo – or Mr Whippy poo - although still a concern, is not strictly diarrhoea.

continued over page

It is the job of the carer to ascertain why the joey has diarrhoea, and this is when your daily records come in very useful (see **keeping accurate records** in **raising orphaned joeys** for more information).

Some of the causes are:

- **Lack of gut flora** (joeys should be offered dirt as part of their daily diet).
- **Too much milk**.
- **Milk formula is too watery**.
- **Poor hygiene**.
- **The joey has eaten something which has upset the gut** (ie: a weed or rich grass).
- **Distress**.

When a joey has diarrhoea the first thing to do is re-hydrate it. See **increasing water intake during diarrhoea** in the **hydration** chapter for more information.

See **treatments for minor conditions** for information on basic remedies.

Remember! diarrhoea should never be ignored. If the joey isn't showing signs of improvement by the third day it will need veterinary attention as soon as possible. Use your judgement however; for example, if the joey is much worse by the second day get it to the vet quicker.

injection infection

When administering any medication by injection it is important to clean the injection site with alcohol first as this will reduce chance of infection.


© Linda Dennis (90)

Infection may also occur, however, when injecting an oily medication as the body can sometimes react badly to the oil base in the medication. The wombat in the photo was given Modecate (for severe distress) which resulted in a blistered infection and hair loss. The wound was treated with Panalog. It should be noted that this kind of wound can take some time to heal (months, not days!) and the hair will take even longer to grow back.

Water based medications should not cause this kind of reaction, however if the medication is oil based you should watch the site very closely for any adverse reaction and treat quickly.

Remember! if the condition appears severe it is recommended that you seek veterinary advice.

injuries while in care

Life for humans is fraught with all kinds of dangers – car collisions, falling off a push bike, spilling boiling water from a kettle, walking under a tree just when a limb decides to fall, even walking up a stairway can result in a kicked and very sore toe!


This joey lost a claw when it became caught during play time (91)
© Linda Dennis

Animals are also subject to hazards. Bare-Nosed Wombat joeys - as with most marsupial joeys - are inquisitive and playful and even the most diligent of carers can experience a joey that is inadvertently injured during its time in care.

When hand-rearing Bare-Nosed Wombats, playtime is one of the times when a wombat joey is most likely to become injured.

The wombat pictured above had the splinter removed, saw a full recovery and was successfully released (92)
© Linda Dennis

Wombats love to jump and climb on objects and injury can be sustained when the wombat attempts to jump or climb off - they are great at climbing upward, however they are not so good at coming down again.

Injuries are also easily obtained in enclosures, particularly on walls and furniture. For example, the wombat pictured left was injured when a splinter from the enclosure furniture became embedded under the eye – presumably during Happy Hour (see **play time** in the previous chapter for more information).

The trick is for a wildlife carer to be able to determine the cause for injury and to eliminate it from the wombat's environment. A carer should not feel guilty that a joey has become injured in care, but should accept that the experience is just part of a learning curve and personal growth in becoming an even better carer.

Remember! if the injuries are severe it is recommended that you seek veterinary advice.

mange

Sarcoptic Mange is the disease most commonly associated with Bare-Nosed Wombats. Interestingly, the condition has never been recorded to afflict Northern Hairy-Nosed Wombats, however - rather disturbingly - it has recently been found in Southern Hairy-Nosed Wombats in regions of Victoria.

There is a simple way to understand mange – and that is, there are three stages of the disease.

- **Stage 1** – skin appears red and has a rash like appearance – this stage can be treated with Revolution (which is also a good product to use for wombat joeys with mange).
- **Stage 2** – skin is crusty and there is fur loss. Good recovery with Ivermectin and crust removal.
- **Stage 3** – too late to save – the wombat is debilitated, starving and has organ failure. It is recommended that the wombat is humanely euthanased.

stage 2 mange (93)
© Carol Pullar

wombat joey being treated for mange (94)
© Linda Dennis

The time frame between the stages are:

- **Stage 1 to 2** – a matter of weeks - the disease can progress very quickly in the initial stages.
- **Stage 2 to 3** – 1 to 2 months.
- **Stage 3** – a wombat can live for months in that state.

Remember! that mange progresses quite quickly and the symptoms are painful and can cause severe distress. It is recommended that you seek veterinary help when treating a wombat with mange.

prolapse

A prolapse is when part of the bowel lining (the mucosal lining) protrudes from the cloaca (as pictured). The cloaca will be very sore and swollen and will be quite painful for the animal.

Swamp Wallaby with a prolapse (95)
© Linda Dennis

How is it caused?

There are a few reasons for a prolapse. 1. the animal is constipated and continually pushing, trying to pass poo; 2. ongoing diarrhoea; 3. over stimulation when toileting.

How to avoid it?

1. It is vitally important to ensure that the animal is kept adequately hydrated while in care. For adults, ensure that there is fresh water available daily. For joeys, this may mean giving water bottles in between milk feed bottles – *remember that the milk substitute we offer them is food and not water!* This is particularly so with Wombaroo fed joeys. Wombaroo is a very thick milk formula and it is imperative that water bottles are also offered. When using Biolac or Di-Vetelact extra water may not be required, but constant checking is needed at all times, which ever formula is used. Obviously, more water is required on hotter days.

2. Diarrhoea should never be ignored! If the diarrhoea can't be stopped within 3 days then it's time to get your animal off to the vets ASAP. Of course, use your own judgement, if the diarrhoea is severe then get to the vets sooner rather than later.

3. When toileting a marsupial joey you only need soft, gentle rubbing to stimulate the joey into passing wee and poo. If the joey has not begun to toilet in 30 seconds – or is not showing signs that is about to (cloaca opening and closing) - cease toileting.

How to treat it.

It is important to ensure that the entire cloaca area is kept well lubricated during a prolapse.

The animal will need to be transferred to a clean environment so that dirt, etc, does not get onto the bowel lining.

For less severe cases sugar (fine) can be mixed with an oily solution (Vaseline, Paw Paw Ointment, Baby Oil Gel, etc) and applied to the cloaca. The sugar makes the bowel lining contract back in and the oily solution keeps the area lubricated.

Haemorrhoid cream can be applied to the area. This also shrinks the bowel lining back into the cloaca.

For severe prolapses, and when the above treatments don't work, a vet will need to anaesthetise the animal, manually push the lining back into place and then insert a stitch to keep it in place.

A prolapse should never be left for long as the bowel lining becomes dry it will become quite difficult to treat. If an improvement hasn't been seen in around 2 hours from the time of prolapse then veterinary help is required ASAP. A vet will also give an anti-inflammatory, antibiotics and probably pain medications for the animal once the stitch is in place.

After the stitch is place, the sugar and oily solution can be applied to help keep the bowel lining in place.

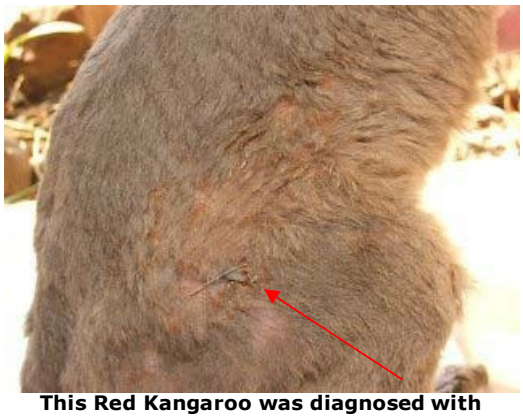
Remember! if the joey condition appears severe it is recommended that you seek veterinary advice.

ringworm

Ringworm is not an internal parasite (worm) but a fungal infection of the skin. In humans it presents itself as round raised welts (see photo next page), however in animals it can present itself in varied forms – not just in rings.

There are different types of ringworm and each appear on the skin differently and therefore ringworm is often difficult to identify without a biopsy.

Ringworm in native animals does not show up under UV lamps, as it does with cats and dogs.



This Red Kangaroo was diagnosed with ringworm by a fungal culture, the biopsy was taken from here (96)
© Linda Dennis

Ringworm symptoms include:

- **Hair loss**.
- **Lesions may appear crusty**.
- **Slight orange colour** (but not always).
- **Fur covering infected area feels hard**.
- **Matted and dull fur**.
- **Nasty looking rash**.

Causes for ringworm in marsupials include:

- **Distress**.
- **Contaminated soil**.
- **Close proximity to cats, dogs and small children** while in care (hosts for ringworm).

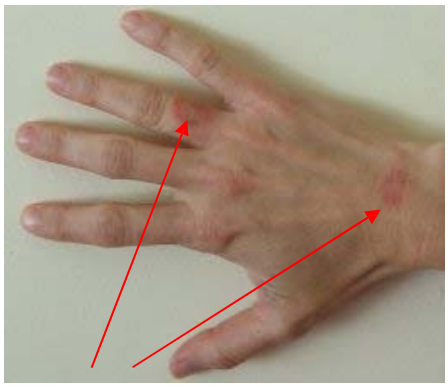
As ringworm is difficult to diagnose visually it should be formally diagnosed with a skin biopsy which is tested in a laboratory for fungal cultures.

Remember! this is a highly contagious condition and infected animals should be isolated.

Remember! ringworm is a zoonosis, meaning that it can be transferred from animal to human.

See **treatments for minor conditions** for information on basic remedies.

Remember! if the joey condition appears severe it is recommended that you seek veterinary advice.



This ringworm was transferred from the Red Kangaroo shown above (97)
© Linda Dennis

stress alopecia

Alopecia is the medical description for the falling out of hair or fur. It can occur for a number of reasons and in wildlife, particularly in-care marsupials, we often see it due to high distress.

Generally, stress alopecia manifests in a mirror image. Imagine a line running down the body of the animal – if the hair is lost in a similar shape or pattern to both sides of that line, the cause is likely to be due to distress.

Northern Hairy-Nosed Wombat with what appears to be stress alopecia (98)
© DERM

As carers, it is then our responsibility to find out what is causing that distress and eliminate it. This may take some time and you will need to be your investigator cap on. It could be due to anything from a change in diet, environment, location or temperature to whether a wombat joey is or isn't buddied up.

Remember! if the joey condition appears severe it is recommended that you seek veterinary advice.

thrush

Thrush is quite common with hand reared wombat joeys. It is a yeast infection that can affect the mouth, the gut or both.

Causes for thrush include:

- **The stress of coming into care** – being separated from mum is pretty frightening for these critters.
- **Unhygienic conditions** – ie: not washing bottle feeding equipment or pouches properly.
- **After antibiotics** – particularly if oral antibiotics are used.
- **Distress** – including a change in routine, carers, introduction of solid food, etc.
- **Teething**.

Signs of thrush include:

- **Very mouthy when taking the bottle** – the joey may seem interested in the bottle but will "gum" the teat when in the mouth.
- **White build up in and around the mouth**.
- **Saliva may appear rusty in colour (when mouth is wiped).**
- **Mouth and gums are inflamed**.
- **Yellow diarrhoea with bubbles, can be smelly (sweet & sour)**.
- **Excessive wind**.
- **Cloaca becomes sore and itchy**.

See **treatments for minor conditions** for information on basic remedies.

Remember! if the joeys condition appears severe it is recommended that you seek veterinary advice.

ticks

There is some thought that native animals are not affected by ticks as humans and domestic animals are, and there is suggestion that there is some immunity to tick related conditions. However, there are some cases of native animals being affected by the paralysis tick.

Wombat joey with a cattle tick (underneath ear) (99)
© Linda Dennis

If a tick is found attached to the body, chemicals such as methylated spirits should not be applied to the tick as it may inject more saliva into the flesh. Frontline Plus and insect repellents containing pyrethrin can be applied directly to the tick which will cause the tick to dislodge from the flesh (after about 24 hours). Pyrethrin will also prevent the tick from injecting more saliva into the flesh. Creams and sprays with pyrethroid or permethrin are also fine to use.

© Linda Dennis (100)

A useful little tool to have in your First Aid kit is a Tick Twister, available from chemists and some vets.

These little hooks are easy to use. The ticks body is passed through the prongs of the hook and with one swift twist the whole tick is pulled out of the flesh. Good for animal and humans alike!

Tweezers can also be used to pull out a tick. Place the tweezers as close to the animals flesh as possible and pull out in one clean motion. The head should dislodge with the body, but if not, the bodies natural defence mechanism will reject it in time.

Note: a diet high in sugar will increase the chance of biting insects such as ticks, fleas, etc.

See **treatments for minor conditions** on the following page and **the naturopathic guide** for more information on tick removal.

Remember! if the joeys condition appears severe it is recommended that you seek veterinary advice.

The Tick Twister (101)
© Linda Dennis

treatments for minor conditions

There are some good medications / applications to have on hand for an unwell or injured joey. These include:

Medication	Used for	Dosage	Comments
Apex	Maggots	Clean wound liberally	Apex is a chemist brought ear cleaner which works very well at eradicating maggots from wounds.
Frontline Plus	Ticks	Spot on.	Frontline Plus kills a range of fleas and ticks, including the Paralysis Tick. Wombats can usually carry (some) types of tick with no problems, but should be treated if burdened by the parasite. There is a range of Frontline Plus for different animals – consult your vet for the right product to use for each case.
Ilium Neocort	Topical treatment for skin condition	Apply thin layer twice daily to affected area. Treat for a maximum of 14 days only.	Antibiotic, anti-inflammatory, anaesthetic skin emollient cream.
Incremin	A booster	Two drops per bottle	Incremin is essentially Vitamin C.
Infacol	Colic (wind)	0.2ml initially. A couple of drops can be given if colic continues.	Can be given in the bottle or directly in the mouth. Seek veterinary advice if colic persists.
Ivomec Oral	Worming	0.1ml per kg.	Administered orally.
Ivomec Pour on	Ticks *(this product can also be used for mange – seek veterinary advice before treating mange).*	Spot on (for external parasites such as ticks) or for a drench (external and internal parasites) use 1ml per 10kgs of bodyweight.	Wombats can usually carry (some) types of tick with no problems, but should be treated if burdened by the parasite. Ivomec Pour On will also eliminate internal parasites, part fur and apply drench to skin on back of neck.
Koamagma with Pectin	Diarrhoea	Furless – ¼ml daily. Furred – ½ml daily.	Do not ignore diarrhoea. If it persists into the 3rd day seek veterinary advice ASAP.
Malaseb	Ringworm and other fungal diseases	Wash joey once a week until signs of fungal infection have gone.	This treatment is used twice weekly for domestic pets, however it is not recommended that a marsupial joey be washed this regularly. Pay particular attention to mouth, feet and under tail area when washing.
Mylanta	Bloat.	1ml per kg, orally.	No more than twice a day.
Nilstat	Oral treatment for thrush, both oral and gut.	Furless - .25ml per kg. Furred - 0.5ml per kg. 3 doses a day for 5 days.	Nilstat can be purchased from chemists. DO NOT use Mycostatin as it has added ingredients that adversely effect Australian marsupials.

Medication	Used for	Dosage	Comments
Nizoral	Thrush	10mg for kg for 5 – 7 days	Some resistance can be found when using Nilstat – Nizoral is an excellent alternative.
Nutrigel	Energy boost (calorie and vitamin supplement)	10g per 5kg (during convalescence)	Can be mixed with milk (after milk has been heated) or apply to clean finger and joey should suck off (very palatable!)
Pain Stop	Pain relief	1 drop - 120g 5 drops - 600g 10 drops - 1200g 20 drops - 2400g	Pain Stop and Infant Panadol can be given in the same dosages. Give 2 to 3 doses per 24 hours.
Panadol (Infant)	Pain relief		
Panalog	Treatment for skin and ear infections.	Apply ointment generously to affected areas.	Apply to affected area two to three times daily.
Paraderm Plus	Cuts, bites, rashes, dermatitis.	Apply cream generously to affected areas.	Paraderm Plus is a mild antibiotic, antiseptic, anaesthetic and anti-inflammatory. It works very well to alleviate symptoms of bacterial dermatitis.
Pentavite	A booster - essentially multi-vitamins.	Two drops per bottle	Pentavite is used to build up a joey after it has been unwell. Purchase the **Infant** formula – available at chemists.
Peroxide	Cleaning necrotic wounds.	Apply un-diluted to the affected area.	Peroxide can also be used as a powerful bleach for cleaning cages, etc.
Peptosyl	Diarrhoea	2.5-.5ml per kg. 3 times a day for 2 days. Reduce to 2 times a day for 3 days.	Lines and soothes the gut. Do not ignore diarrhoea. If it persists into the 3rd day seek veterinary advice ASAP.
Prednoderm	Cuts, bites, rashes, dermatitis.	Clean area of crust and debris. Apply 3 times daily.	For the treatment of acute and chronic dermatitis. It is an anti-inflammatory and antibacterial ointment. It is a thick, green ointment which can be quite messy although very effective.
Protexin	A pro-biotic used to increase gut flora		Can be used in the first instances of diarrhoea or daily. Add to milk. See **milk additives** for further information.
Repel-X	External parasites	External use only.	Repel-X is an insecticidal and repellent spray. Can also be sprayed onto bedding material.

Table adapted from "Medications". Macropology. ***Cheryl Dooley****.*

ALWAYS CONSULT YOUR VET IF YOUR ARE UNSURE ABOUT TREATING A WOMBAT.
NOTE: this is a guide only.
It is recommended that you consult your vet before proceeding with treatment.

Some natural remedies include:

Remedy	Used for	Dosage	Comments
Acidophilus Powder	Probiotic used to increase gut flora	Use your judgement – depends on size of joey. Recommended dosage is ⅛ teaspoon per bottle for furless and just furred and ¼ teaspoon per bottle for furred.	Can be used in the first instances of diarrhoea or daily. Add to milk. See **probiotics** for further information. Do not ignore diarrhoea. If it persists into the 3rd day seek veterinary advice ASAP.
Bach Flower	Stress & shock	4 drops, 4 times daily.	Can be administered directly into the mouth or via the bottle.
Charcoal	Removing toxins from the gut.	Use your judgement for dosage amounts – depends on size of joey. Crush charcoal and add to bottle.	Ensure that you are using charcoal from non poisonous native trees. Alternatively, you can buy charcoal tablets from health food shops.
Citronella Spray	External parasites	5ml of citronella dissolved in 10ml of methylated spirits then mixed with ½ litre of water. Use in a spray bottle.	Or use 2.5mls each of lavender oil and citronella oil. Metho is used to break down the oil, without it there will be clumps of oil floating in the water and it will be ineffective.
Lavender Oil	Mange	Apply to mild mange infected area - always mix with a carrier oil like Almond Oil or Olive Oil – at least 75% carrier oil and 25% essential oil (or even 90:10)	This remedy is for mange in humans, however may assist in mild cases of wombat mange. Lavender Oil applied directly to skin is likely to cause burns – always mix with a carrier oil.
Medihoney Antibacterial Honey	Topical application for the treatment of cuts, abrasions and wounds.	Spread honey on an absorbent dressing and place with the honey contacting the whole of the affected area.	Change dressing daily.
Medihoney Eczema Cream	Topical application for the treatment of cuts, abrasions and wounds.	Apply directly to wound.	The Eczema cream is much creamier than the straight antibacterial cream and can be rubbed in to skin.
Metamucil	Constipation	Furless - ⅛ teaspoon Furred - ¼ teaspoon	Mix into every other bottle for 1-2 days or until symptoms ease.
Nads' Foaming Foot Wash	Ringworm	Apply foam to area and massage. Rinse thoroughly with water.	
Olive Oil	Constipation	Guestimate!	Olive oil can be mixed into the bottle but it is a long process until it reaches the blockage. Alternatively, mix the oil with some warm water and draw up 1-2ml in a syringe and insert into the anus. This can be done every few hours until the hard faeces is passed.

Remedy	Used for	Dosage	Comments
Olive oil and bicarbonate soda	Colic	Furless - ¼ml Just Furred – ½ml Furred – 2ml	Bicarbonate soda unites air bubbles into one mass making it easier to pass, olive oil acts as a mild laxative helping to empty the bowel.
Paw Paw Ointment	Topical application for treatment of minor cuts, abrasions and wounds.	Apply generously to affected area.	Paw Paw is a totally natural product so there is no worry if the wombat licks at the ointment.
Weak Tea	Soothing for a upset tummy.	Use your judgement for dosage amounts – depends on size of joey.	Use plain tea. Add the tea to milk or give between milk feeds. Alternatively make up the milk formula using the tea.
Yakult	A pro-biotic used to increase gut flora	Use your judgement for dosage amounts. Recommended dosage is either 1 bottle or ½ a bottle of Yakult mixed to one litre of milk.	Can be used in the first instances of diarrhoea or daily. Add to milk. See **probiotics** for further information. Do not ignore diarrhoea. If it persists into the 3rd day seek veterinary advice ASAP.
Yoghurt - natural, non flavoured only	A pro-biotic used to increase gut flora	Use you judgement for dosage amounts. Recommended dosage is ⅛ teaspoon per bottle for furless and just furred and ¼ teaspoon per bottle for furred.	Can be used in the first instances of diarrhoea or daily. Add to milk. See **probiotics** for further information. Do not ignore diarrhoea. If it persists into the 3rd day seek veterinary advice ASAP.

toxic plants

There are many plants that are commonly found in gardens or vegetable patches that are toxic to animals, including wombats. There is a fairly large list of toxic plants; listed below are some of the more common ones that can be found in gardens which may affect wombats.

Avocado

The flesh and seed of the avocado can be poisonous if consumed. Symptoms include diarrhoea, vomiting and laboured breathing.

Azalea

See Rhododendron.

Blue Green Algae

This algae is a food source for complex organisms, however under particular environmental conditions, for example hot temperatures, warm still water, drought and reduced water flows, the algae undergoes an enormous population explosion resulting in algal blooms which can kill an animal if consumed.

If Blue Green Algae contacts skin, the skin can become itchy and rashes may form. Lips can swell and eyes and ears can become irritated. If the infected water is swallowed, nausea, vomiting, abdominal pain and diarrhoea may be experienced.

continued over page

Liver problems can occur as can muscle weakness. The more Blue Green Algae swallowed the sicker the host becomes. Toxins from Blue Green Algae can be lethal.

Buttercup

The entire plant is poisonous if consumed. If the juice from the buttercup (ie: from the stem) is consumed it may severely injure the digestive system. The plant may also cause dermatitis.

English Ivy

Berries and leaves are poisonous if consumed. Signs of poisoning include gastro-intestinal problems. The plant may also cause dermatitis if touched.

Daffodil

The bulbs of the daffodil are poisonous if consumed. Symptoms include nausea, vomiting, diarrhoea caused by the alkaloid toxins. The plant also causes dermatitis if touched.

Daphne

All parts, particularly the berries and seeds are poisonous. Symptoms include gastro-intestinal and kidney upset. The plant may also cause dermatitis if touched.

Holly

The berries in Holly are poisonous if consumed. Symptoms include an upset stomach, tremors, seizures and loss of balance.

Honeysuckle

The plant and berries of the Honeysuckle bush are poisonous if consumed, although they are considered minimally toxic. Symptoms include vomiting, diarrhoea and lethargy.

Hyacinth

The bulb is the main toxic part of the plant. Hyacinth poisoning is reported to cause vomiting and abdominal discomfort. Treatment includes emptying the stomach.

Hydrangea

Affected animals may experience painful gastroenteritis, and diarrhoea which may be bloody.

Hydrangea may contain *cyanogenic glycoside hydrangin*, but poisonings do not generally involve effects or clinical signs of typical cyanide poisoning. It should be noted that Hydrangea poisoning is rare, but it has been recorded that a horse was seriously poisoned after eating a single potted hydrangea.

Kikuyu Grass

Kikuyu poisoning is a severe and sometimes fatal condition of cattle, but the condition can also affect native animals. Outbreaks occur when animals graze kikuyu which is growing rapidly after recent rain or irrigation. These outbreaks appear more likely to occur after a prolonged dry spell and in paddocks which have been unstocked for some time.

Signs of kikuyu poisoning include abdominal pain, depression, incoordination, aimless wandering, recumbency and eventual death. Drooling of saliva is also a characteristic feature of the condition. In the early stages or in mildly-affected animals, small quantities of thin, clear saliva are often drooled. Drooling becomes more pronounced as the disease progresses.

Lantana

The major clinical effect of Lantana toxicosis is photosensitization, the onset of which often takes place in 1 to 2 days after consumption of a toxic dose (1% or more of animal's body weight).

Jaundice is usually prominent and the animal can suffer from constipation. Other signs may include: sluggishness, weakness, and transient diarrhoea, which can sometimes be bloody. In acute cases, death occurs in 2 to 4 days. Subacute poisoning is more common and may result in death after 1 to 3 weeks of illness and weight loss.

Raw photosensitized surface areas are susceptible to invasions by blowfly maggots and bacteria. In severely affected cattle, lesions may appear at the muzzle, mouth, and nostrils. Ulceration may be present in the cheeks, tongue, and gums, while swelling, hardening, peeling of mucous membranes, and deeper tissues occur in the nostrils.

Lilly of the Valley

All parts of the plant are poisonous. Symptoms from poisoning include irregular heart beat and pulse accompanied by digestive upset and mental confusion.

Oleander

All parts of the oleander shrub are extremely poisonous and can cause death. Even a small amount of the plant being eaten or sucked can be fatal.

Oleander poisoning affects the heart and produces severe digestive upset. The cardiovascular system can be affected causing seizures. Other signs of poisoning include abdominal pain, salivation, gum irritation, drowsiness, dilated pupils and slow, irregular pulse.

Treatment can rarely be given in time (before coma and death) and involves emptying the stomach.

Onion (and garlic)

All parts of the onion plant are considered poisonous. The poisoning occurs a few days after the pet has eaten the onion.

Poisoning causes haemolytic anaemia where the animal's red blood cells burst while circulating in the body resulting in red urine. Kidneys can become enlarged and liver will degenerate. Other signs are diarrhoea, no interest in food and a dull and weak lethargic appearance.

While garlic also contains the toxic ingredient found in potatoes (thiosulphate), it seems that garlic is less toxic and large amounts would need to be eaten to cause illness.

Philodendron

All parts of the Philodendron shrub is poisonous if consumed.

If any part of the Philodendron shrub is consumed it can cause diarrhoea. The plant can cause a burning sensation in the mouth when eaten, so the poison rating is low.. It can also cause dermatitis reaction when touched.

Poinsettia

The leaves, stem and sap are the poisonous parts of the Poinsettia, which is also known as the Christmas Bush, however the toxic rating is low.

Symptoms of poisoning include diarrhoea, abdominal cramps and delirium. The sap can cause irritation, and if rubbed in eyes - blindness. The plant can also cause dermatitis.

Potato

The leaves and immature fruit are considered toxic. Potatoes that have turned green can cause severe illness if consumed.

Potatoes have a high GI rating (see below) so the digestive throughput is very quick. Therefore potatoes have very little nutritional value for marsupials, particularly the Bare-Nosed Wombat who metabolises food slowly. Consequently food that is rated with a lower GI (and carbohydrate level) are better choices.

Glycemic index, abbreviated to GI, is a way of classifying carbohydrate foods according to their effect on blood glucose. Food with a high GI produces a quicker response in digestion and therefore food is stored (made into fat) or evacuated quickly. Foods with a low GI produce a lower response in digestion and therefore more nutrition and energy will be gained from the food.

Privet

Both the leaves and berries of Privet are toxic, however it is not a common poisoning.

Symptoms of poisoning include vomiting and diarrhoea with blood, collapse and convulsions. Kidney failure and death have also been reported.

Rhododendron

All parts of this plant contain toxic resins with the leaves being the most potent. Poisoning from consuming Rhododendron produces gastro-intestinal irritation with some haemorrhage, secondary aspiration pneumonia, and sometimes renal tubular damage and mild liver degeneration.

Clinical signs usually appear within 6 hours of ingestion. Affected animals may experience anorexia, depression, acute digestive upset, hypersalivation, nasal discharge, epiphora, projectile vomiting, frequent defecation, and repeated attempts to swallow.

There also may be weakness, incoordination, paralysis of the limbs, stupor, and depression. Aspiration of vomit is common in ruminants and results in dyspnea and often death. Coma precedes death. Animals may remain sick for more than 2 days and gradually recover.

Rhubarb

The leaves of rhubarb are the toxic part of the plant, although the toxic level is classified as low. If large amounts of raw or cooked leaves are consumed it can cause convulsions, coma and in extreme cases, death.

Other signs of mild poisoning are staggering, trembling, breathing difficulties, weakness, diarrhoea, increased drinking and urinating.

Sorghum

Although Cyanide (Prussic Acid) is present in ***forage*** sorghum at low levels most of the time, acute poisoning is more likely to occur when the plant is growing fast, such as when it rains after a dry spell; or when the plant is suffering under hot, dry conditions; or in damp and overcast conditions.

However, cyanide poisoning may be an overrated problem as the number of (stock) deaths due to poisoning is very small compared to the number of animals grazing sorghums. However by observing a few simple rules, you can prevent serious loss.

- Avoid grazing stressed plants and avoid regrowth crops ratooning as a result of storm rain.
- Delay grazing until plants are over 45 cm high for shorter varieties or over 75 cm high for tall varieties. This greatly reduces the risk of cyanide poisoning. Plants forming flowers or grain are least likely to cause poisoning.

- Don't graze hungry animals on sorghum crops, particularly if the crop is wilted or stressed.
- Supplement animals on sorghum crops with sulphur (10% sulphur in a salt lick).

Cyanide poisoning generally affects a group of animals, not just an occasional one. Sudden death occurs, often within one hour of eating the plants, but may be as fast as 15 minutes. Sickness is rarely seen, however difficulty breathing, restlessness, and moaning might be noticed before the animal lies down and dies. Sometimes there is a convulsion just as the animal dies.

Wisteria

All parts of this plant are poisonous. Poisoning from consuming any part of the Wisteria bush causes digestive upset caused by alkaloid toxins.

Symptoms include nausea, repeated vomiting, stomach pains, severe diarrhoea, dehydration. Severe poisoning can result in collapse.

PLEASE NOTE: This is not a complete list of poisonous plants.

caring for larger wombats

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Caring for a larger Bare-Nosed Wombat is particularly difficult. Wild wombats are very aggressive and their "stressy" natures do not mesh well with being in captivity for long periods.

Adult wombats rarely come into care, but when they do it is commonly due to mange, motor vehicle accident or from being attacked by a predator (eg: dog) or another wombat (eg: territorial).

If the reason for a larger wombat coming into care is minor, eg: exhaustion, bruising, minor wounds or the first stages of mange, then it should be treated and released as soon as possible. It is unadvisable to keep an adult wombat in care for any longer than a few days – certainly not weeks.

For example (from a real life scenario):

> *An adult male wombat was received into care after being in a territorial fight. Another wombat had savagely attacked this wombat, mainly in the rump area, leaving weeping flesh and gouges. The wombat was covered in mud; cold and lethargic. The mud on the wombat was washed off and the flesh and wounds were cleaned with a diluted Dettol mixture. Antibiotic cream was applied. The wombat then slept for 36 hours. When the wombat came too it nearly ripped the house down (it had been housed in an enclosure in the laundry where it was kept warm). It was assessed and released. The wombat has since made a full recovery and is still living in the area.*
>
> This wombat had previously been raised in care and released approximately 1 year before the incident. See **territorial aggression** in the **case studies** chapter for more information.

Certainly, not all adult wombats would cope with being in care in a similar situation – it is up to the carer to assess the individual wombat and make a decision to take the wombat into care based on its needs.

temperature

All warm blooded animals have the ability to keep their body temperature constant and the "normal" body temperature is slightly above that of its usual surroundings. (Triggs, 1996). A wombat's ability to regulate its own temperature decreases as the air temperature rises above 25° Celsius.

A Bare-Nosed Wombat does not have the ability to sweat and therefore cannot tolerate excessive heat and will become heat stressed very quickly if exposed to temperatures over 28° Celsius. It is recorded in **Australian Mammals Biology and Captive Management** that Bare-Nosed Wombats have shown signs of overheating at 24°C.

The average temperature in a wombat burrow has been recorded at around 25° Celsius (although they can range from 10° to 27°C – Jackson, 2005), and this is the temperature a wombat feels most comfortable at. Sprinkler systems may aid in keeping the air temperature at an appropriate level.

Therefore it is advisable that temporary shelter for adult wombats is designed so the air temperature does not rise over 25° Celsius. Where possible, wombats should not be transported at temperatures above 25°C.

signs of stress (or *distress*)

Signs of distress in an adult wombat are:

- **Hissing**
- **Screaming** (long, high pitched, wheezy type of sound)
- **Growling or snarling**
- **Teeth gnashing**
- **Pawing at ground**
- **Charging at walls of enclosure**

If you see any of these signs you need to retreat from the wombat as soon as possible. If you don't, the wombat will only become more distressed and blood pressure could rise detrimentally. **Remember!** severely distressing a wombat may lead to death.

stressors

The following conditions can further stress an adult wombat that is in short term care. What we are aiming for is to keep the wombat as stress free as possible so that it can heal quickly and be released as soon as possible (ie: within days of coming into care).

- **Being able to see out of the enclosure** will encourage the wombat to try and escape – the inability to get out would cause considerable distress. Solid walls are essential.
- **Having strangers (ie: carers) at close range and being unable to flee** will distress a wombat. Keep visits to the enclosure to a minimum. For example: administer any relevant medications, clean enclosure and leave food and water in the one visit. Carry out any duties and exit the enclosure as quickly as possible. If medications aren't needed, enter the enclosure when the wombat is asleep.
- **If the enclosure is too close to human dwellings** (and therefore within ear shot of unusual noises that wombats aren't used to) could cause great fright, leading to distress.
- **If the enclosure is too close to an area housing dogs** (a natural predator of wombats) could cause great fear and distress to the wombat. Fear of dogs should be instinct in a wombat, and being able to smell a dog close by may stress the wombat considerably.
- **Excessive temperatures** (too hot or too cold) can cause distress and illness. A wombat should be kept at around 25^{o} Celsius.

If you see any of signs that the wombat is distressed you need to retreat from the wombat as soon as possible. If you don't, the wombat will only become more distressed and blood pressure could rise which could be detrimental to the animal. **Remember!** a severely distressed wombat can lead to death.

food supplement

Try to keep food offerings to an adult wombat as close to what it would normally eat in the wild. Providing too much unnatural food, such as sweet potato or pumpkin, may cause stomach upsets, causing enteritis.

Suitable supplementary food for an adult wombat in care could include:

- **Native grasses** such as tussock, spear grass, kangaroo grass and wallaby grass. Introduced grasses are also eaten. Kikuyu is not recommended as it can be poisonous in lush spells, particularly after dry conditions, and can cause death (see **toxic plants** in **the unwell joey – a carer's perspective** for more information).
- **Tuberous roots** can be dug up from the area the wombat originated from. Ensure that the roots that you collect are from native non-poisonous plants.
- **Lucerne, kangaroo pellets, sorghum (milo)** (see **toxic plants**), **Completo and Cop Rice** can also be offered in small quantities.
- **Do not offer unprocessed oats** – as the spikes can become embedded in gums causing disease.

wombat with natural and supplementary food (103)
© Linda Dennis

Please note: there are carers throughout Australia who have vast experience in caring for adult wild wombats. One in particular that I can recommend is Roz Holme of Cedar Creek Wombat Rescue. If you need assistance with caring for an adult wild wombat please contact me and I will put you in direct contact with Roz.

housing

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A wombat joey has a range of housing needs, dependent on its age. This chapter will cover the housing or enclosure needs from furless joeys to joeys in a pre-release enclosure.

the furless or just furred joey


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A furless or just furred wombat joey will need to be housed in a small makeshift pouch so that it feels safe and secure. If the pouch is too big the joey could become distressed. See **signs of stress (or distress)** in **raising orphaned joeys** chapter for more information.

The makeshift pouch shouldn't be too small either. There should be just enough space for the joey to move easily while still remaining snug.

Cotton inner liners, such as babies t-shirts with the arms and neck holes sewn up or small pillow slips, can be used for joeys in warmer climates. Alternatively, you can make your own using soft fabric, such as t-shirting material.

Cotton is the ideal fabric to use in warmer climates as it breathes and the temperature can be controlled easily. Most synthetic fabrics should be avoided as they are either too hot or too cold. Woollen inners should also be avoided as the fibres may be "scratchy" on tender skin. Ingested fibres from wool and synthetics could also cause blockages in the gut.

In colder climates polar fleece material is an excellent option for inner liners as the fabric retains warmth even if the fabric becomes wet. Polar fleece material is made out of recycled plastic bottles and cannot absorb water and therefore, if ingested, does not cause blockages but is eliminated with normal bodily waste.

The joey will then need to be placed inside warm wrappings, known as outers. The number of outers will depend on the size of the animal and its ability to retain heat (see **temperature** in **raising orphaned joeys** for information). Outer liners can be made of wool or polar fleece. Finally, slip the joey (inside its inner and outer) into a bag made of sheepskin or feather down. Sheepskin and down holds the warmth and is soft and padded which helps to keep the joey feeling secure.

One of the most important things to remember when caring for a furless or just furred joey is that it cannot regulate its own temperature and must be placed on a heat source. There are several options available. See **heat source** in **raising orphaned joeys** chapter for more information.

Just furred joeys can also be housed in a small, lined pet carry cage that is padded with multiple layers for warmth and security.

Joeys at this stage (**1 to 1.5kg**) often tend to escape from makeshift pouches, so it is a good idea to place the pouch inside the carry cage.


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The two joeys in the photo at right were initially housed in separate pouches but they decided to escape and were found together at the bottom of the cage. We continued to house them like this however the sheepskin liner on the bottom of the cage, which was used as insulation, was enclosed in a pillow slip to avoid consumption of fibres.

Arrange the liners in the cage kind of like a sandwich – sheepskin layer on the bottom; then woollen liners; then cotton or polar fleece liners; then woollen liners and finally another layer of sheepskin. So that the joey does not come into direct contact with the sheepskin or woollen liners place them into a pillowslip before adding to the cage.

Place a heat source at one end of the cage so the joey can move closer too or further away from the heat source if it gets too hot or cold.

Wombat joeys are great escape artists, so make sure the lid on the cage is closed or they may escape and get lost in the house which could lead to distress. See **signs of stress (or *distress*)** in **raising orphaned joeys** chapter for more information.


© Carol Pullar (107)

the fully furred joey


© Linda Dennis (108)

A fully furred joey, around the **3½ kilo** stage, will need to be moved into a large box or crate, so that it has some freedom to move around and explore. A wild joey at this stage would be spending more time outside the pouch, but only within the burrow. To duplicate this type of environment the box should be relatively small, roughly 2 metres square. A cover should be placed on top, ensuring that there is air movement so the joey does not suffocate.

The bottom of the crate should be lined with dirt and then a thick layer of leaf litter. The leaf litter will allow faeces to fall through gaps in the litter and the urine will sink down into the dirt while keeping the top relatively dry. Alternatively the box can be lined with paper or towels, but this is not recommended as the urine and faeces cannot escape and the lining will become saturated quite quickly allowing bacteria to grow.

The lining should be replaced regularly. If using dirt and leaf litter the lining will not need to be replaced as often as with paper or towels.


© Linda Dennis (109)


Another example of an enclosure for small wombats (110)
© DERM


© Linda Dennis (111)

Inside the box there should be a snug den. There are a couple of options for this:

- A canvas duffle bag, like the ones used for macropod joeys, can be hung on a hook or stand and placed in one corner of the box. A cotton or polar fleece inner placed inside a woollen outer can then be pinned inside the bag. The amount of woollen outers will depend on the temperature required (see **temperature** in **raising orphaned joeys** for more information).
- Alternatively, lie a pet carry cage on its side and place in a corner. Pad the inside of the cage with multiple layers of fabric and cover the outside of the cage with a sheet or blanket, leaving a flap over the front so the inside becomes nice and dark.

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As the joey grows the pet carry cage can be replaced with a larger cage or box, a cocky cage is a good size. Ensure that the cage is always covered so the joey feels safe and snug in its den.

The housing for a fully furred joey should not need a heat source, unless the joey is unwell (see **the unwell joey** in **raising orphaned joeys** for more information).

Sleeping, not dead! (112)
© Linda Dennis

the pre-release enclosure

Once the joey is **fully emerged** it will want to spend more time awake at night and will need more activity to stimulate its mind. At approximately the **6 kilogram** mark (it depends on the mental state of each animal) the joey can be moved into the outside enclosure. The enclosure needs to be made of solid and sturdy material so as to keep the joey in. In the wild, wombat joeys are constantly with their mothers and would be easy prey if left alone, so the enclosure must be escape and predator proof.

Walls can be made of solid material such as tin or wood sheeting. Fencing wire can also be used but should be lined with shade cloth so the joey can't see out and not hurt itself on the wire. Also, if the joey can see out of the enclosure it may try to climb, chew or scratch its way out which could seriously damage paws or mouth.

An enclosure for a wombat needs to be quite large so that the wombat can become used to exploring and foraging. If the joey does not get to mimic the normal activity of a wild wombat then it will not have much chance when released.

Suggested enclosure measurements are approximately 7 metres by 4 metres (George et al, 1995), or larger. Walls should be at least 1.5 metres above ground level.

Size approx 14x4 metres (104)
© Linda Dennis

This enclosure has two 5x3 pens with a middled shared area (113)
© Shirley Lack

The flooring of the enclosure needs to be impenetrable so that the wombat cannot dig its way out.

There are a few options:

- **Concrete floors** can be used but must have a thick layer of dirt over the top so the wombat can dig.
- **Mesh or fencing** wire can be laid under the dirt, either throughout the whole enclosure or around the enclosure walls only.
- **A rock barrier** can be placed around the enclosure walls. Different size rocks should be used and many of them. When the wombat tries to escape it usually digs around walls, the rock barrier keeps tumbling down into the hole the wombat is making.

  Extend the enclosure walls below the ground surface - suggested depth is 1m (George et al, 1995).

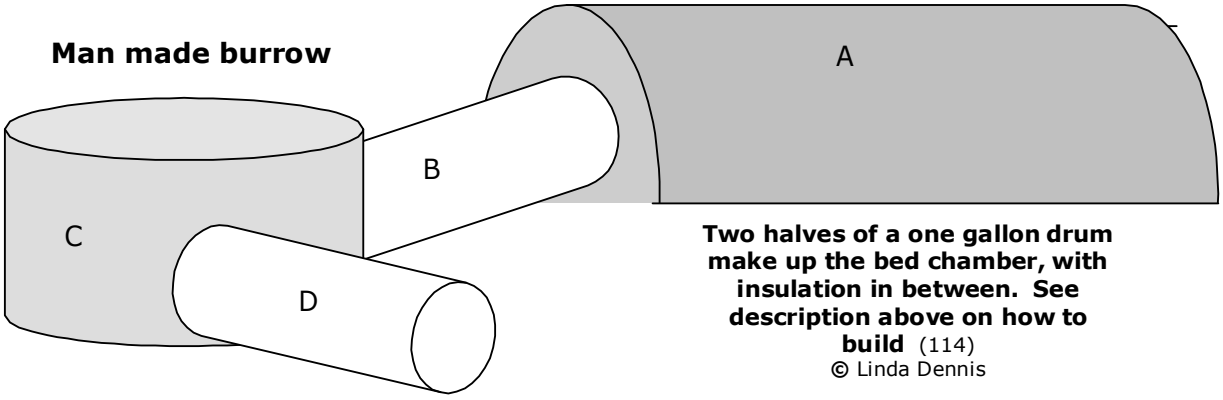
the enclosure burrow

The enclosure should be furnished with an insulated burrow. **Remember!** a wombat cannot tolerate high heat and temperatures of 28° Celsius and over should be avoided. The temperature of the burrow should be around 25°C as that is the approximate temperature of burrows in the wild.

Following is an example of a human made burrow that will keep the wombat at a comfortable temperature.

- **Cut a 44 gallon drum in half lengthways**, this will make the bed chamber (**A** in below design). Cut a hole in *one* end of both halves, this will be the entrance to the bed chamber.
- **Place one half of the drum on bare dirt** and then cover it entirely with insulation bats. Place the other half of the gallon drum on top of the insulation bats.
- **Get a length of plastic tubing**, approximately 1 metre in length and 250mm in diameter and place one end in the end of the drum (**B**).
- **Cut the end off a second 44 gallon drum** (**C**) and cut two holes in the sides. Don't cut the holes directly opposite each other, as you want an angle to the next burrow length. Place the drum so that one hole is fitted snugly over the length of pipe and then cut another length of pipe which will be fitted in the other side hole (**D**). The angle will prevent light from entering the bed chamber at the very end of the burrow.

Man made burrow



Two halves of a one gallon drum make up the bed chamber, with insulation in between. See description above on how to build (114)
© Linda Dennis

Burrow is at the end, under cover

© Linda Dennis (115)

© Linda Dennis (116)

- **Cover the whole construction with lots of dirt** and sew grass seed over the whole surface to stop erosion.
- **Make sure that there is plenty of soft dirt throughout the whole enclosure** so that the wombat can dig freely and experiment with making burrows – digging is an essential learning skill for a wombat to gain prior to release.
- **Finally, create a natural looking entrance**, using rock, logs, etc. Every now and then partially block the entrance with more dirt so that the wombat can experiment with digging the burrow again.

Using this method of gallon drums and plastic piping is ideal as when the wombat experiments with digging it will not ruin the bed chamber and risk being exposed to extreme temperature overnight or during the day.

Alternate Method:

Joeys that have been buddied (see **benefits of buddying** for more information) will often reach a point when they will no longer tolerate each other. At the 17kg mark – sometimes more, sometimes less - joeys start to show their independent nature and sharing a burrow with their former friend is no longer an option!

To accommodate this a burrow with two chambers is recommended.


© Linda Dennis (117)

- Create a box without a floor using waterproof material such as formply (pictured right). The box should be separated into two chambers with a hole at the front of each chamber, this is where the burrow tunnels will be attached.

- Line the top of the box with insulation and then place a waterproof roof over the top, such as corrugated iron (as pictured above), formply, plastic etc.


© Linda Dennis (118)

- Two long lengths of PVC pipe (approximately 250mm in diameter) can be used to create the burrow tunnels (as in the photo at right). The longer the lengths the more chance the temperature in the burrow chambers will remain constant. **Remember!** that wombats cannot tolerate high heat – natural burrows have been measured at around 25°C or lower and this is the approximate temperature a carer should aim for in a man-made burrow.

- The pipes may need to be supported by blocks at each end so they do not dislodge from the burrow.

- Place straw (or similar insulation material) in and around the burrow to help maintain the temperature. Try and stuff each crack and crevice with the insulation material.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© Linda Dennis (120)

- Finally, cover the entire burrow with a deep layer of dirt (as pictured left).

The wombat buddies will more than likely continue to sleep together until the day comes when one will be unceremoniously shoved out!

other aspects of the pre-release enclosure

Other essential components of the pre-release enclosure include:

- **A sheltered** area, preferably covering the burrow entrance.
- **Logs, trees, rocks and other natural furnishings** that a wombat can climb over and dig under, etc.
- **A release hatch** that can be blocked off until the wombat is ready for soft release. The release hatch should be small enough for the wombat to get through and keep predators (such as dogs) out.
- **Lots of soft dirt** for the wombat to practise its digging skills.
- **An area for the wombat to defecate**. Try collecting the wombat's poo and placing it in the corner you want the wombat to use. A wombat tends to defecate in the one area and will not want to dirty its bed chamber.
- **A variety of grasses** for the wombat to graze on

enclosure for a wild adult wombat

Caring for a larger Bare-Nosed Wombat is particularly difficult. Wild wombats are very aggressive and their "stressy" natures do not meld well with being in captivity for long periods.

If the reason for a larger wombat coming into care is minor, eg: exhaustion, bruising, minor wounds or the first stages of mange, then it should be treated and released as soon as possible. It is advisable to keep an adult wombat in care for no longer than a few days – certainly not weeks.

A temporary enclosure for a wild adult wombat should not be large. It need be only big enough to have a sleeping chamber, a clean area for food and water and an area to defecate in.

The following aspects are advisable for a temporary enclosure:

- **Solid, or lined walls** so that the wombat cannot see out. If the wombat can see outside it will be encouraged to try and escape which could cause injury to the wombat. The walls should be around 1.2 metres high with smooth walls (Jackson, 2005).
- **A concrete floor** so that the wombat cannot dig its way out of the enclosure. You also want a clean enclosure (concrete as opposed to dirt) that does not harbour bacteria and so dirt cannot get into any wounds.
- **There should not be a gate** leading into the enclosure as this will be a weak spot for the wombat to try and push its way through.
- **An insulated sleeping chamber** should be in one corner. Line the chamber with straw or dried grass for the wombat to burrow into.
- **An area for food and fresh water** to be placed that will not become contaminated by faeces or urine.
- **An area where the wombat can defecate**. Try collecting the wombat's poo and placing it in the corner you want the wombat to use. A wombat tends to defecate in the one area and will not want to dirty its bed chamber.

chapter nine

release

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essential components of a release site

There are several essential components required for a good release site for Bare-Nosed Wombats. These are:

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- The area must be the correct habitat for Bare-Nosed Wombats, which is mainly in sclerophyll forest, often mountainous areas. The wombat requires a temperate, humid micro-climate with suitable burrowing conditions and native grasses for food.

  See **distribution** in **general biology and development** chapter for more information.

- **There must be wild Bare-Nosed Wombats already living in the area**.
  If there are no wombats already living in the area you must ask yourself: Why? Is the habitat suitable? Are there plenty of native grasses? Have they been eradicated and if so, why?

- **There must have been wild Bare-Nosed Wombats living successfully in the area until human interruption** (ie: being shot, etc). Of course, you would only ever consider releasing a wombat in this type of area if you know for certain that the reason they were eradicated has gone (like somebody shot the shooter!). You also must ensure that the area remains prime habitat for Bare-Nosed Wombats and that wombats will be able to live successfully in that area. It is recommended that you contact your local National Parks and Wildlife Service for their approval before you release a wombat in this type of area.

- **Neighbouring land owners are supportive of wombats being released in the area.** There is no point releasing a wombat into an area where it may be unwanted - and even eradicated - by neighbours.

- **Surrounding land at release point must also be suitable for Bare-Nosed Wombats**. The normal home range for an adult wombat ranges from around 2 to 4 kilometres, so you must ensure there is enough space for the wombat to roam freely.

- **The release site is not overcrowded**. If you release a wombat into an area that is already heavily populated then it may not survive. Wombats are territorial animals and a newcomer may be attacked.

- **The release point, ideally, should be away from major roads (and train lines)** as many wombats are killed on the roads. Wombats have poor vision, and as their main sense is via smell, wombats don't know that a car is approaching until it's too late (because they can't smell it!).

- **Time!** Wombats should be released using the soft method wherever possible. A release carer needs plenty of time to be able to tend to a wombat while it is in the soft release process.

is the wombat ready for release?

A wombat needs to be in prime condition before it can be released into the wild. It needs to be strong and healthy with absolutely no sign of weakness. Weaknesses would include illness, injury or a mentally immature wombat that may not be ready for life in the wild.

Factors indicating a wombat is ready for release are:

- **Size and weight are vitally important**. A soft released wombat should weigh around the 20 kilogram mark, give or take. If a hard release option is being used then the wombat should weigh around the 24 kilogram mark or above. Each animal is different however, so other factors should be used to determine release viability. An undersized wombat may be vulnerable to attack from predators.
- **The wombat should be accustomed to living outside**. The wombat needs to have experienced all weather conditions, including hot days, cold days, storms, etc.
- **The wombat should be able to identify its natural food**. For several months before release (especially a hard release) any "un-natural" food should be slowly withdrawn and natural food (including grasses, sedges and roots) should be increased. If the soft release method is being used then any un-natural foods can be slowly withdrawn while the wombat is becoming accustomed to their new area – this will lead to a better adjusted and secure wombat.
- **The wombat should be afraid of predators**. This includes people and dogs. A wombat that is not afraid of humans and waddles up to strangers should not be released as it is unlikely to survive in the wild. It is essential that a wombat is terrified of dogs – a wombat may be able to hold its own if attacked by one dog but is vulnerable - and will probably be defenceless - if attacked by a pack of dogs.
- **The weather conditions must be fine**. This is especially so if a hard release is used. If a wombat is released during prolonged rainy periods then it may be unable to dig a suitable burrow and may be exposed to the weather. It will also be vulnerable to attack by predators as it will not have safe shelter to escape to.

soft releasing

A soft release method is normally used when a carer releases a hand raised animal from their home and supports it for some time after release. This is the recommended method for releasing Bare-Nosed Wombats.

Soft releasing is a long process and is quite time consuming on the carer. The carer needs to have time to be with the wombat as it is exploring its new home at the wombat's pace. The soft release process allows the joey to become familiar with the area and it also gives the joey confidence to move away from the carer at its own pace. A stress free transition to the wild is what we want for a hand raised joey.

When using the soft release method it is essential that you take the wombat joey on "wombat walks" so that it becomes accustomed to its home range. During these walks you need to allow the joey time to explore and to experiment digging burrows.

Wombat walks should start at around 9 to 10 months of age (around 5kgs).

Wombat using release hatch from enclosure (123)

This is the time when a wild joey would be leaving the pouch permanently and beginning to explore the outside world with its mother.

Ensure that you stay close to the joey, however, as in the wild a joey rarely loses tactile contact with the mother at this age, and is very close by if it does.

Take the wombat over as much terrain as you can, especially if there are several wombats already living in the area. The joey will need to know as much of the range as possible so that it knows where to move on to if another resident wombat doesn't like it in the area.

© Linda Dennis (124)

© Linda Dennis (125)

Be warned, however, that the longer your walks the more tired your joey will become and you may end up having to carry the joey (or joeys) back home!

hard releasing

Hard releasing is commonly used for adult animals that have come into care and are released back into the area they originated from. It is also sometimes used to release hand raised joeys if a soft release method can't be used. There is little to no support for the animal when using this technique and for that reason it is not a recommended option for releasing a wombat joey.

A wombat joey shares a very strong bond with its mother and will stay with her until it is approximately 18 months old. When raised by humans a wombat joey will have a similar bond with the carer and will need support as it is becoming used to its new home. Wombats stress very easily and a hard release does not allow for stress free transition from being in captivity to living in the wild.
However, if a hard release option is being used you will need to ensure that you have a large enclosure for the wombat to live in. It will need to have space to explore and dig and do all the things a wild wombat would do.

At approximately 12 – 15 months of age you will need to start to withdraw from the wombat, and by around 18 months of age all contact should have ceased. The wombat should see you as a threat and show aggression if it is approached by you. Aggression can be shown in the way of vocalisations, eg: snarls, screams and hissing.

You will need to have done your homework in finding a suitable release site well in advance of releasing the wombat. This will involve not only finding a suitable location, but

surveilling the area for a number of weeks to ensure that there are no aggressive wombats, or any other threat, already in the area. It is a good idea to talk to your local National Parks and Wildlife Service for help finding a suitable release site for your wombat. See **essential components of a release site** for further information.

When the wombat is approximately 24 kilograms or over it can be moved to the release site. A smaller wombat should not be hard released as it may not have the strength to defend itself against a larger and aggressive wombat.

You will need to sedate the wombat for the journey to the release site as the trip may distress it considerably. You will need to stay with the wombat until it is fully conscious again so that it does not come under attack. Early morning and late afternoon are the best times to hard release a wombat. If you are releasing in the morning it will need to be very early so that the wombat regains consciousness and moves underground before it gets too hot.


© Lorraine Bell (126)

Remember! a wombat cannot tolerate high temperatures and it is best to avoid releasing on days with temperatures over 28° Celsius.

To make the transition easier for the wombat take some of its scats with you and place in the burrow that you have chosen. Try to push the scats as far in as possible so that the wombat will be encouraged to move in deeper. Also, it is advisable to take some food with you, kangaroo pellets for example, and also place these deep in the burrow.

You will need to monitor and support feed the wombat for several months after release. If you visit the wombat in the late afternoon you may be rewarded with a sighting of the wombat and you can check to make sure it is coping well and hasn't been injured. When you leave food ensure the wombat doesn't see you do it as it may become dependent on humans and waddle up to the wrong person.


At the new location (127)
© Lorraine Bell


A few hours after release, the wombat has been exploring underground (128)
© Lorraine Bell

chapter ten

living with wild wombats

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Many a farmer and home owner have become frustrated with wombats digging holes either in their paddocks or under the house. Many people also believe that as Bare-Nosed Wombats are classified as common in most areas that it gives them the right to eradicate them either by trapping and relocating or by killing them.

Keep in mind however that even our native animals that are considered common need to be protected.

Living with wildlife is part of living in a rural environment. Sharing our homes with wombats isn't that hard and can even be an enjoyable experience.

wombat relocation

Wombat relocation rarely works for a couple of reasons:

- When a wombat is trapped and moved another wombat will take its place.
- The wombat that is being moved is unlikely to survive in the new area it is placed in. Wombats are very territorial and it is likely that it will be attacked by another wombat already living in the area. Wombats rarely kill each other in attacks, but an injured or displaced wombat can later die from complications such as hyperthermia or heat stress if they can't find a new home to protect themselves from extreme temperatures, or if any wounds become infected.

It is better to learn how to live with wombats, and there are many ways that you can do this. Keep reading this chapter for helpful hints for living with wombats.

However, if you are sharing your home with a particularly aggressive wombat that is attacking your family or pets, then it is recommended that you contact your local National Parks and Wildlife office for help in relocating the wombat. They will be able to assess areas for good wombat habitat and for population numbers.

wombats under the house

In areas where there are a high population of wombats it is quite common for them to burrow under houses. There are measures that you can take however, to discourage this activity.

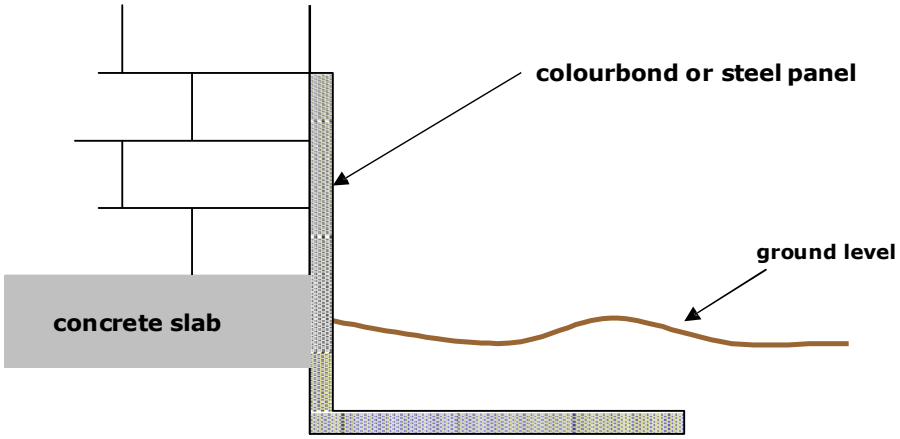
Removing a wombat generally does not work as another wombat will just take its place. Similarly, filling a burrow in rarely works either. A wombat tends to like its home and will just dig another entrance to reach its burrow.

Trapping and relocating isn't advisable as wombats are very territorial, and will more than likely attack a wombat that has entered its territory. Wombats that have been attacked in a territorial display can later die from complications, such as wound infection, or hyperthermia or heat stress from not being able to find a new home and being left outside in extreme temperatures.

The best way to discourage a wombat is by using repellents. A wombat likes a clean burrow and the use of repellents will discourage the wombat and it will more than likely move off to find another burrow site. See **wombat repellents** in this chapter for more information.

Alternatively you can place barricades around the perimeter of your home. Using inflexible material such as steel or Colourbond, create a right angled panel system that runs along the whole side of the house where the wombat is trying to dig. Make sure you place the

bottom of the panel below the level of the slab. The bottom of the panel needs to be quite long as the wombat may move out further to dig under. Panels that run along the length of the house will need to be fixed together so that the wombat cannot push in between the overlapping panels.



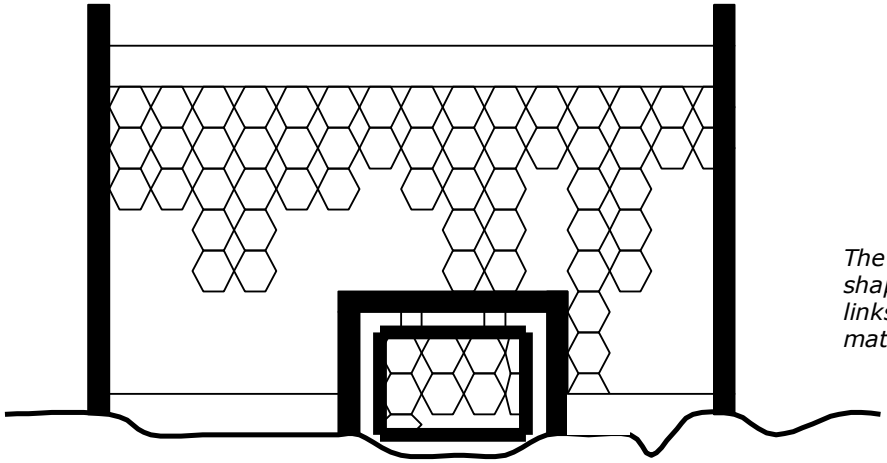
© Linda Dennis (130)

wombats and fences

Wombats are creatures of habit and will use the same track that they have created on a daily basis. If a wombat finds an obstruction in the way of its path it will not go around it - it will remove it! This often results in damaged fences where the wombat digs under or even pushes through the fence. Wombats are incredibly determined animals and it doesn't matter how often you try to barricade their pathway they will not rest until they have made theirway through again.

Providing a wombat gate is the best way to solve this problem. The gate needs to be solid and strong so that other animals (that don't have the strength of a wombat) can't get through it; for example sheep, foxes, rabbits, etc.

Below is a design that is quite successful. You will need to use heavy material, such as steel, to make the frame and gate. The gate needs to be hinged so that it can be pushed open from both ways. The bars of the frame will need to be dug into the ground and is best supported with concrete so that the wombat won't simply push it out of the way.



The hexagonal shapes depict the links in fencing material

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Jackie French, in her book **The Secret World of Wombats**, suggests making a gate out of an old tyre. Build a frame, similar to the design on the previous page (but much bigger) and string up the tyre from the top of the frame. This design would allow smaller animals to also get through however as there is a gap between the tyre and the square corners of the frame.

continued over page

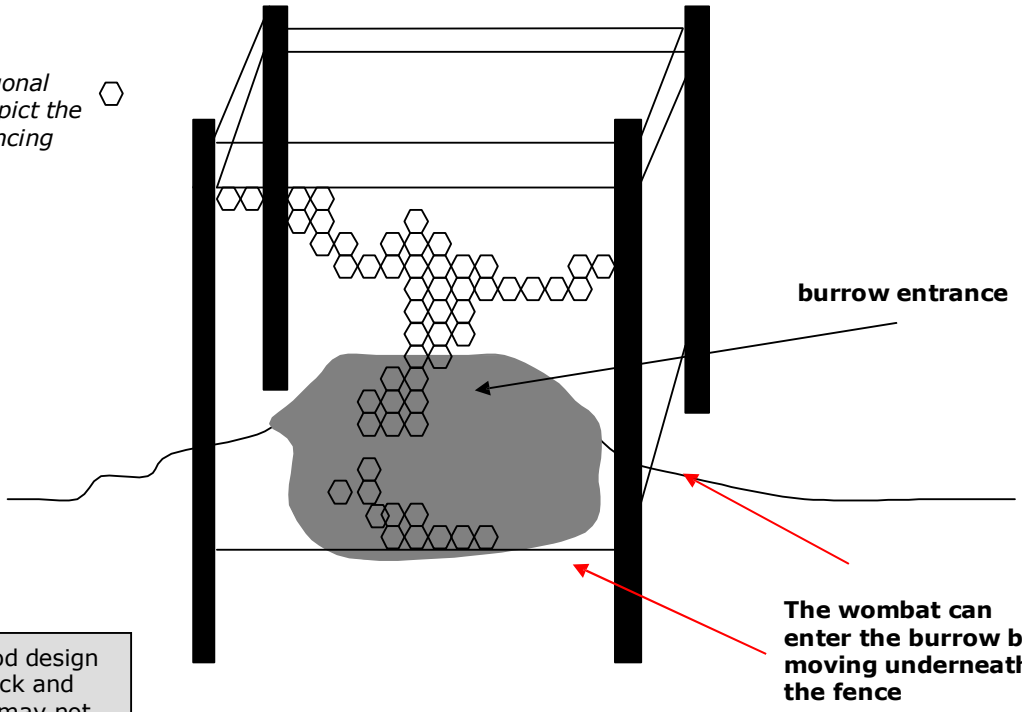
As an alternative to a wombat gate you could try using wombat repellents in the places you don't want a wombat to go. See **wombat repellents** section in this chapter for more information.

wombats in the paddock

Horse and stock owners are often concerned that their animals will injure themselves by falling down wombat burrows, and rightfully so. The entrance to a wombat burrow can sometimes be quite large and a horse could break a leg if it fell down the hole.

Eradicating the wombat is not acceptable – after all the wombats were there first! Even if you do eradicate the resident wombat another one will just take its place.

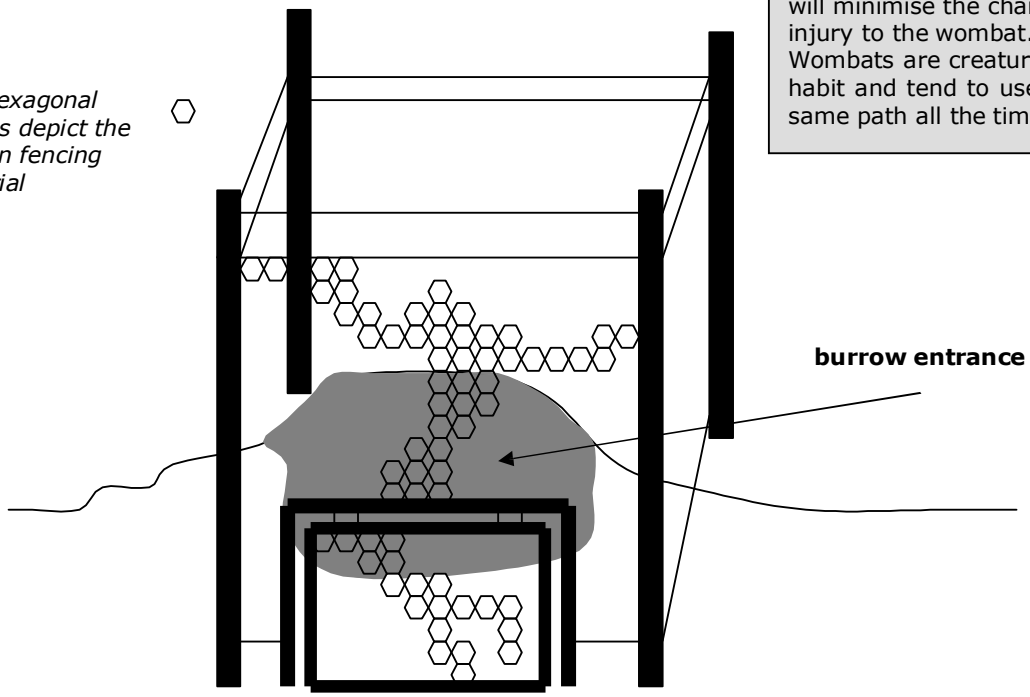
There are ways you can adapt your paddock so that the wombats and stock can live together, and generally all it takes is a simple fence around the burrow entrance. For example, use four star pickets and place around the burrow entrance. Leave enough space between the lower wire and the ground so that the wombat can move underneath easily and gain access to the burrow. The illustration below is crude, however it gives you an idea of what the fence would look like.



This is a good design for large stock and horses, but may not be suitable for sheep and lambs – see next page for alternate method.

An alternate method for fencing off a wombat burrow is similar to the previous design, but with a gate. The fencing in this design can be lower to the ground (to keep smaller stock away from the burrow). The gate should be made with heavy material so only the wombat can push through.

This is a good design for small stock. Try to determine the usual path that the wombat uses to enter the burrow and place the gate on the path – this will minimise the chance of injury to the wombat. Wombats are creatures of habit and tend to use the same path all the time.



wombat repellents

A wombat likes a clean burrow and will tend to abandon their home if there is a foul smelling "thing" in the way. There are several repellents that have proven successful in discouraging a wombat from digging in a particular area.

- **Poo from another species** of animal seems to work well - particularly chicken poo and dog poo. The dog poo works very well as dogs are the natural predator of wombats – so it makes sense that where there is dog poo wombats will rarely go.
- **Naphthalene Flakes** can be sprinkled around the area; wombats do not like the strong smell. However, keep in mind that Naphthalene is considered toxic.
- **Blood and bone** is also a "turn-off" for wombats. However dogs go crazy with blood and bone and may dig the area instead!
- **A chicken carcass** that has been sunned for 24 hours can be pushed inside a burrow. A wombat will not re-enter a burrow with a foul smelling "dead animal" inside.

blocking a wombat burrow

If the helpful hints in this chapter haven't fixed your problems and you have decided to block a wombat burrow so that it cannot re-enter, make sure you do it at night!

Each evening (when it's cool) wombats leave their homes in search of food (and sometimes the opposite sex!). Normal activity for a wombat is to slowly emerge from the burrow and sniff the air. Most wombats have a "lie patch" - a mound of dirt that has been excavated from the burrow - just outside the burrow opening. This is an ideal spot for a wombat to catch the last rays of sun of the day and assess what's happening around the burrow. It might even doze during this time.

After a time, normally at dusk or after dark, the wombat will slowly move away from the burrow, while sniffing the air for any danger. If you try to approach the wombat at this time it will bolt back to its burrow and may not emerge for some time.

Wait until the wombat has moved well away from the area. A wombat will roam several kilometres in a night, so the further away the wombat is the better.

Make any necessary modifications to the burrow during that time so if the wombat comes back home to the burrow and finds it filled in there is enough time to move off to another burrow and security for the day ahead.

Always check in the morning that the wombat hasn't been stranded. **Remember!** that wombats can die from heat stress – temperatures over 28° Celsius are detrimental to a wombat.

how many wombats?

Many land owners believe that they have a zillion wombats grazing in their paddocks when in reality there may only be a few.

If you would like to work out how many wombats are living in one particular area then all you need to do is count wombat poo (French, 2005). In the morning, when all wombats have gone off to bed, count the fresh poo and divide the number by 100. One wombat produces around 100 pellets a night, so this sum will tell you how many individuals (roughly) are living in the area.

an unwell adult wombat

Most wild animals have the ability to hide any signs of illness, which is called Preservation Reflex.

An unwell animal may receive the unwelcome attention of predators so, when ill, it cleverly masks the signs to protect itself. A wild animal that shows signs of being unwell may be well advanced, as with the wombat shown at right.

© Cara Lee (134)

This wombat was severely malnourished due to a malalignment of the teeth. As a result the poor wombat couldn't grind its food and was starving.

You can see that the wombats coat is dull and patchy; these are tell tale signs of an unwell wombat. This wombat was humanely euthanased as long term rehabilitation would have been needed which may well have stressed the wombat further.

Wombats have Preservation Reflex to a degree. However, as wombats live in burrows they tend to hide from view entirely when they are unwell, or stay close to the burrow and go

for cover if feeling threatened, so we don't tend to see them as often as say, a kangaroo. An extremely ill wombat, as with the wombat above, will tend to graze during the day while staying underground, in safety, during the night when it is more vulnerable.

One illness that cannot be masked is mange. Signs of mange, including fur loss, damaged and cracked skin and blindness are quite apparent. An infected wombat may also appear to be quite lethargic and weak.

Wombats with advanced signs of illness or disease can rarely be saved. The best way to help a wombat in this type of situation is euthanasia.

© Linda Dennis (42)

The best way to euthanase an adult wombat is a quick shot to the brain. The **X** shown on the graphic at left is the best place to position the gun muzzle. The gun muzzle can also be placed on the back of the scull, between the ears.

Alternatively, you can secure the wombat in a bag or box and take it to the nearest vet clinic for euthanasia.

case studies

© Linda Dennis (15)

the benefits of buddying – by linda dennis

This male wombat, Fuddles, came into my care after being raised by a member of the public from the Central West area of NSW. He was just furred when he first came into care and weighed approximately 7 kilograms when transferred to me.

Weighing approximately 7kg.
Aged approx. 12 months old (33)
© Linda Dennis

Fuddles had been a much loved family member. He had been raised on his own, with the family's children and domestic pets. The carer had attempted to soft release Fuddles, however he didn't move far probably mainly due to his age – he was really too young to be released - and because he was used to intense human contact.

The area where he was to be soft released was in a semi-rural area with neighbours close by. Fuddles was transferred to me when he attempted to make a burrow under the neighbour's house – which, of course, they didn't really appreciate!

We housed Fuddles indoors for a few nights so that he could get used to the sounds and smells of his new home. He was then moved outside into an enclosure set up for him on the verandah, where he remained for several weeks. I must note here that this was during cooler months of the year – in warmer months a wombat could have overheated in this situation.

© Linda Dennis (104)

After a period of time Fuddles was moved into a 14 metre long and 4 metre wide enclosure furnished with a make-shift insulated burrow.

As Fuddles had already become accustomed to his freedom, the enclosure soon became his prison and he spent many nights trying to escape.

Wombats can be soft released at around the 20kg weight, and should be considerably larger if a hard release technique is used (which is not recommended). However, we were concerned for his safety as he was doing himself damage trying to escape from the enclosure. We also took into account that he had survived "in the wild" at the 7kg mark, so we opened the enclosure door and Fuddles was allowed to roam. He weighed approximately 12kg.

We had two other smaller wombats in care at the same time as Fuddles. Keti and Alu were a few kilos smaller than Fuddles and were being raised together, as buddies, from the just furred stage. On many occasions we tried to socialise Fuddles with the girls however they didn't get on and Fuddles would often lunge and bite at them, and often times we found ourselves having to be a barrier between him and the girls.

He never did any damage to the girls, but his "nasty" antics did frighten them. Over a period of several months we persevered in socialising the three wombats, however it was quite evident that Fuddles liked us much more than he liked the girls.

For a long time Fuddles lived in the enclosure and then moved into another make-shift burrow that we had made a short distance from the house. He moved regularly between the two burrows until we blocked off the enclosure to make way for Keti and Alu.

We encouraged Fuddles to explore and learn to live a wombat life. However, weighing approximately 18kg, he still came home and called for us, at night, under our bedroom window!

We tried many things to discourage Fuddles from wanting human company. We totally ignored him, we left food out in the paddock near his burrow, we even tried scaring him away. Nothing worked and his desperate calls got the better of us – by ignoring him he was became a very distressed boy.

We were ecstatic when, after several months of living in the make-shift burrow, Fuddles finally moved further away.

© Linda Dennis (102)

© Linda Dennis (135)

On a bush walk one day we stumbled upon his new home, a burrow under a cliff line about 1 kilometre from our home. We were also delighted when he started spending more and more time away from us, and wouldn't return for days at a time.

But when Fuddles did return after his jaunts he stayed for several days. He made himself a home behind the fridge in our garage and nothing could persuade him to leave - he rather liked his other "human life".

In comparison, Alu and Keti were dependent on each other and not on us. They still liked their wombat walks and the time we spent with them in their enclosure but would happily return to their burrow or back to grazing and weren't too upset when we left. As the girls got bigger they weaned themselves off us which was very pleasing to see. Weaning a hand raised joey off its carer can be a stressful time for an animal so it was nice to see that the girls were doing it themselves and were well adjusted because of it. Not long before release Keti actually disliked us in her enclosure and would growl at us when we entered.

Living with Fuddles - a wombat that had been raised without a buddy - has not been easy. As cute and cuddly as wombat joeys are when little, when they reach their juvenile years they become monsters!

As Fuddles grew he became a bundle of raging hormones, and at times he has been hard to live with. We had to board up our front door as Fuddles would try and rip it down of a night - and he thought nothing of launching an attack on my husband or me when attention giving was not quick enough. Most of the time Fuddles was playing or just nipping at our ankles to say hello. Nipping is the normal way for wombats to say hi to each other, it's just that wombat skin is so much tougher than human skin - and it hurts us!

No real damage was done, however he had enormous power and when he chose to brandish it we did receive minor bruising on our lower legs. Being long time carers, we are confident when handling aggressive animals – however most people aren't and the damage from an angry wombat can be severe.

Luckily Fuddles has only shown his "*human*" side with us, and only in our immediate home environment. We sometimes stumbled upon him while taking an evening bushwalk around our property - he never looked back as he fled the scene! And he rarely ventured near the house when strangers were about. It would have been a complete disaster if he had shown no fear of humans – or predators – at all. We would have had to move him to a different area - not inhabited by humans - which may have led to incredible distress. Or another wombat in the area could have attacked him in a territorial display which later could have

led to complications. Or worse, we may have had to euthanase him if he had attacked somebody else. So, in a way, it was good that we were the only ones to receive his rough affection.

In the most part, Fuddles has had a bloody good life (except for one nasty episode – see **territorial aggression** for more information). I know that his initial carers had the very best intentions while raising him and we did our best to ease his transition into the wild, however, Fuddle's transition has had many a hiccup. I am confident that one day however he will get there and won't look back, but I can't help but think that he would have assimilated better if he had been raised with a buddy.

I think this story shows how buddying orphaned wombat joeys together is a real plus. Of course, it's not always possible, but if you get the opportunity to buddy two or more together grab it!

When two or more joeys are raised together they tend to form a strong bond with each other and lesser so with their human "mum". Wombat joeys do bond very strongly with their carer, so some degree of "*humanisation*" is to be expected, however to combat this it is essential to slowly withdraw from a hand raised wombat, and when the wombat has another wombat friend to depend on it is so much easier.

The less a wombat depends on humans as it establishes its place in the wild, the more successful the release. The transition to the wild is a lot smoother if raised in a buddy style and the wombats don't demand human attention as intensely or for as long.

Hello! I'm here……. (136)
© Linda Dennis

This barricade will not stop me, grrrr……(137)
© Linda Dennis

Heeeeaaaave……. (138)
© Linda Dennis

territorial aggression – by linda dennis

Wombats are known – in most cases - to be particularly aggressive animals and can be highly territorial. Both male and female wombats are known to guard their grazing patches and in times of drought will fight to defend their territory.

Males can also be territorial of "their women!" (females that share, or border on their home range) and do not like new males sniffing around or attempting to mate with females they perceive as "theirs". Since being released we believe that poor Fuddles has come across such a male.

Fuddles was soft released on my property several months before Alu and Keti, my two hand raised girls. Before the release of these three wombats there were no wombats living within our property boundaries, although there was a healthy population living in the immediate surrounding area. When the girls were released we think that one of the big males from the neighbouring reserve must have sniffed them out and decided to come see the attraction.

One morning - when luckily I was at home - Fuddles turned up on the doorstep – it was 11am when wombats would normally be tucked up in bed.

© Linda Dennis (139)

It was raining, and Fuddles looked wet, but I decided not to go out as I figured he would just start nipping at my ankles. On a second glance though, I noticed that Fuddles didn't look so great. He very slowly waddled up to the sliding door and plonked onto his bum, head down, eyes closed.

© Linda Dennis (140)

Concerned with his appearance I rushed outside and he barely registered that I was there. I bent down and saw that he was caked in mud from head to toe and the mud was also in his eyes.

He had no energy, was cold and lethargic. I quickly gave him a once over and was horrified at the state of his rump. Most the fur on his "bum plate" had been ripped out exposing patches of red and weeping flesh.

I washed Fuddles eyes and face with warm water and noticed he also had a minor injury on his forehead. One of the claws on his right paw was also missing.

I called my husband Todd, who was at work, as I needed help to wash him down, bathe his wounds and assess the damage. Todd was home within 15 minutes of my call and we started the slow process of washing him down.

© Linda Dennis (141)

continued over page

After bathing Fuddles with diluted Dettol and warm water we saw the extent of the damage. His skin was red raw over most of his rump and there were many gouges in the flesh. The gouges hadn't broken the skin, thanks to the hard plate that covers the rump area, but they were deep and angry and black.


© Linda Dennis (142)

After Fuddles was cleaned up we made a bed for him in a crate and used the bedding material he had while in care. We brought him inside into the warmth as he was so cold and lethargic and we were worried that he wouldn't survive the night if left outside in the cold.

Fuddles slept for 36 hours straight. He did wake once during the night and we thought he was ready to go back outside, however he found a corner to wee and poo in and then slowly waddled back to his bed and fell back into a deep slumber.

Late the next night we awoke to Fuddles screaming the house down!. Apparently that was long enough to be inside, thank you very much! We moved his bed onto the front verandah and this is where he stayed for several weeks before gaining the courage and strength to return to his burrow.


Fuddles, several months after the attack when the wounds had healed (15)
© Linda Dennis

Fuddles visited on and off for a couple of months before he left home again for good. His bum healed very nicely and his fur was starting to grow again.

He gained a couple more kilograms from the good food that "Mum and Dad" had on offer. But, even with yummy food on tap, his wild instinct told him it was time to leave Mum and Dad again – he's been gone now for approximately 2 months.

It is so comforting to know that Fuddles knows where safety and help is. I'm sure one day we'll see him again - if he needs us.

seizures and poo – by linda dennis

It's something that you'd never think would go hand in hand – seizures (from some kind of abnormal neurological function) and poo! But apparently - so my hand raised Bare-Nosed Wombat Keti showed me - there is a connection. This is a not a scientifically documented occurrence, in fact there doesn't seem to be much known about the connection at all, but from the ordeal that Keti went through it certainly does seem to be an issue and one that we should keep in mind.

I received Keti as a furless joey, aged approximately 4.5 months and weighing 542 grams. Her mum had been hit by a car, but luckily for her, she was rescued not long after the accident and brought into care.


© Linda Dennis (27)

Keti had a pretty hard start. She was my first tiny wombat, but when I saw her I was concerned with her appearance – she looked gaunt. I set Keti up in a warm, humid environment and started a feeding regime using Wombaroo formula. She was taking her milk and seemed settled, but a few days later she still looked "wrong".

I took some photos, including the one above, and emailed them to an experienced wombat carer. I received an urgent email back saying that the hollows in her temples indicated an immensely distressed, malnourished or dehydrated joey. I had been told by her rescuers that she had only been in care for a few hours and that they had kept her bundled up and warm until I arrived to collect her, so I am at a loss as to why Keti was in such a bad way when she was received into care. Maybe her wombat mum had been struggling during the drought and Keti had been compromised before coming into care. Who knows? That part of Keti's life will remain a mystery.

I was advised that although she didn't look dehydrated in the photo, sub-cutaneous fluids may be beneficial. And I was told that if I couldn't pull her out of the condition she was in she would probably die within days. PANIC!! The next day I took her to the vet's and she was given sub-cutaneous fluids. I also decided to increase our contact with her and started carrying her in her pouch tucked down my jumper - she improved remarkably. Those hollows disappeared within day and she gained weight - a week and a half later she weighed 670 grams.

The next month went by without incident. I had noticed, however, that Keti wasn't poo-ing regularly but I was advised that it wasn't uncommon for a wombat joey to go without passing faeces for days at a time. I noted in my diary that 3 days had gone without a poo and although I was concerned I was told not to worry and she would pass faeces when ready. A week went passed and she only did a couple of very small poos. During this whole time she was offered water as well as her normal milk intake. I mixed olive oil into her milk to make the bowel lining slippery so poo could pass easier. Keti was constantly checked for hydration and appeared fine.

Then, at 10pm at night, Keti had a seizure. It was one of the most frightening things I have ever experienced as a wildlife carer. Her tiny little body, now weighing around the 1 kilogram mark, convulsed and contorted and her breathing was very sporadic. When the seizure stopped her body became rigid and the look in her eyes showed she was terrified. The worst thing – she stopped breathing - my husband Todd immediately performed mouth to nose (!) resuscitation. What seemed like forever but was probably only about a minute or so her body relaxed and she started breathing normally. She was exhausted and fell into a deep sleep until the morning.

Keti was taken to the vet's the next day and we could find no reason for her not to be passing normal faeces. My vet, Kim Rolls, was also concerned that she hadn't passed, and didn't agree with the advice I was given about "not pooing" being normal. Kim gave Keti

an enema and recommended I take her home and insert oil mixed with warm water into her anus. Although the oil in the bottle is good, it doesn't work as well as the oil being inserted straight into the anus. The oil forms a slippery coating around the faeces and the warm water absorbs into the faeces making it softer and easier to pass. Keti passed several small faeces over the next week, but not as much as I'd hoped.

Six days later I was on my way into town with Keti and her buddy Alu so that Todd could look after them as I was meeting up with a friend for lunch. 500 metres down the road Keti had her second seizure. It was similar to the first - her little body (1.2kg) was rocked with spasms. When the seizure was over her body, again, was as stiff as a board and her breathing stopped. This time it was me who gave mouth to nose resuscitation! When she appeared over the worst of it I drove to Todd's work and rang Benn Bryant, Senior Vet at the Western Plains Zoo to see if he could shed some light. I advised him what had happened and he told me to come directly to the clinic for intensive tests. Dubbo is an hour and a half's drive but I left straight away - all thoughts of my much anticipated lunch were forgotten (sorry Margie!).

Benn took blood and also gave her an ultrasound (or x-ray, can't remember which one it was now!?!?!) to find there was a fair bit of faeces built up. Keti was given more sub-cut fluids and after finding nothing else wrong I was allowed to take her home. Later, blood test came back showing a very healthy little wombat. The mystery continued.

Two days later Keti did the biggest poo in the whole wide world! I could find no substance in the poo that may have blocked her up (yes, we wildlife carers have to look through poo!) although some of the poo was very hard. Since that day Keti poo'd regularly and didn't have another seizure.

During my visit with Benn he told me about a baby rhinoceros at the zoo that suddenly showed signs of neurological problems. He seemed fine one day, but then suddenly couldn't stand and kept falling onto his bum. After a few days of tests - and head scratching - Benn and his team gave the rhinoceros an enema. Hey presto! No more falling on bottom!

Keti on a "wombat walk" (143)

So, there's got to be link there somewhere between no poo and seizures. Maybe the discomfort and bloat from being constipated pressed on the spinal column which then affected the brain? I really don't know for sure what happened and my vets don't either - but my advice from all of this is to never ignore a joey that hasn't poo'd for a while – it's just not right! Always act on it, whether it's via sub-cut fluids, enemas or whatever – always act sooner rather than later!

By the way, Keti was (soft) released some months later - a strapping 17 kilogram bundle of wombat and she still lives in the area today.

a hassle free hard release – by lorraine bell

My first boy came into care in August 2004 weighing 2.2kg. He was found wandering alone in Namadji National Park near Canberra. Despite searching for some time, his rescuers could not find his mother.

Between the frequent feeds, cuddles and general settling in process, I wondered what to call him – after all he was strong, feisty and seemed to be injury free – so I was optimistic he would thrive. I don't know why it took me so long to come to the obvious name, after all the only things I seemed to say to him when feeding him was "Ouch" or "Ouch that really hurt".

Apart from the finger 'biting' when he first arrived, Ouch proved to be a gentle soul. He was extremely playful and loved to run around at full speed.

In no time at all, Ouch was over 23kgs and was ready to be released back to where he had come from. For weeks I travelled to Namadji looking for a suitable site: away from roads, somewhere with a good food and water supply and a local wombat population close by. Finding a site that would meet all these requirements was the easy part.

The hard thing for me was not being totally confident that I had raised an independent wombat or one that was healthy and fit enough to defend his territory. No matter how much I talked to other carers, my concerns remained. Also the logistics of a hard release seemed daunting.

I had to delay the release day several times because of inclement weather – at last the drought had broken and it poured, then there were frosts and then it poured with rain again. Finally the weather cleared and the release could not be put off any longer. I started to make preparations in earnest:

- The carry cage was placed in his enclosure days before the release day
- I co-opted a friend to come and assist on the day (someone Ouch was familiar with)
- I medicated him and watched his behaviour closely in case he had an adverse reaction to it

On the day of the release – Sunday 2 October - Ouch seemed to sense something was going on. He got up mid afternoon to prowl around his enclosure. I though it would be difficult to persuade him to get into the cage. He proved me wrong. With only a little bum push, he climbed into the cage and sat waiting for us to get organised.

We tied the covered cage into the back of the ute and set off for the 40 minute drive to Namadji. When we arrived, we uncovered the cage so that Ouch could take a peek at his new surroundings. He was stressed and panting, but quite calm. When he seemed confident with the new smells and noises, we carried the cage down the hill to the burrow I had selected. We all sat quietly for some time before opening the cage door. Ouch was out and down the burrow in a flash.

© Lorraine Bell (126)

The burrow was not to his liking and he got stuck into the renovations with gusto. Now and again he would re-surface and stick his nose into the air to sniff. While Ouch was digging out his new home, we unpacked the bedding, grass and scats we have brought from home.

Within an hour, Ouch had nibbled some grass and set about investigating his new front yard. He would not venture far from us to begin with.


© Lorraine Bell *(128)*

Eventually his foraging took him further a field and for longer periods. On one of his longer treks, we decided to start walking back up the hill. Ouch must have been busy being a typical inquisitive wombat or maybe our trudge through the bush was remarkably quiet (hard to believe), either way, he did not come running after us.

When we had found a good vantage point at the top of the hill, we sat and watched the rustling in the undergrowth. For more than 30 minutes we watched him feed, sit and explore. Seeing and hearing no sign of a distressed wombat, we left him for the night.


© Lorraine Bell (144)

The next day, we returned to the burrow to find Ouch had not eaten any of the grass left for him nor had he spent the night in the burrow. My heart sank, I felt sick. What had happened to Ouch? Then we heard movement further down the hill. There he was sitting outside a better burrow site, surveying his domain. The site he had found was so much better than the one I had selected for him. After all what do we humans really know about burrows?!

We edged closer, but he took one look at us and bolted down his hole. We walked around the site checking that he had been eating. There was evidence he had been quite active during the night. We sat close to his burrow and waited. He did pop his head out, but the sight or smell of us sent him straight back down his burrow. Having waited for some time in the hope of seeing him again we gave up and set off back up the hill. Close to the top of the hill, we heard him emerge from his burrow. He stayed on his 'sit' for ages before heading downwards.

I have been out several times to check his progress. I have not seen him, but have noted evidence of wombat activity around the burrow.


© Lorraine Bell (120)

babushka – by liz mcneil

Babushka while she was in care (145)
© Liz McNeil

I had spent hours in fire ground searches since March 2009, rescuing sick, starving wombats from areas in Victoria. At first most of the wombats were seemingly okay, and we were only really rescuing wombats being hit by cars or directly burnt from the fires. We were doing food drops and this seemed adequate, until July of this year, we started seeing tired, lethargic, skinny wombats out during the day from 12 noon onwards, trying to pull up the 2mm of grass, that had grown back, or dig at burnt tree roots. My husband and I and a small team of wildlife volunteers, that had completed all the necessary training, bought in around 20 wombats and transported them to good carers, many died from their ordeal or had to be euthanized. They were all fairly easy rescues, which for a wombat, tells you something is wrong.

Until I met Babushka….

Babushka wondering back into the bush (146)
© Liz McNeil

Myself and another rescuer were driving along food dropping, and from a distance, I spotted her, I had become pretty good at that. She was pulling up grass from the roadside, as in the forest area it was all burnt and the fire had been the most intense in this area. I could see her prominent, square bum plate and her spine as we walked in for a closer look. I put my thumbs up, that mean's the wombat needed to come in. I walked in front of her and the other rescuer walked behind her, she looked at both of us, as if deciding which way would be safer, she chose me! I got my blanket ready and slipped over, right in front of her, which made her go for cover under two burnt logs. I quickly got up and put the blanket all the way over her.

All was going well, until I called the other rescuer to help, as I didn't have the best of holds on her. From this moment we got to know Babushka. She growled fiercely, it wasn't a normal wombat growl, it sounded like 100 tigers and under the blanket, she was stomping her front leg, like a bull does before it charges. I had never encountered any wombat rescue like it. Most are too tired and run down, that they "sink" when captured.… not this one….

We arrived at the carers, and Babushka was all settled and calm. I warned the carer that she appeared feisty and to take care. The carer assessed her as being severely underweight and anemic, due to poor diet, and needing to remain in care for quite a few weeks. We took her to a wombat enclosure, and the carer with many years experience, just put her hands in and gently placed Babushka in the enclosure. She did nothing! No growl, no stomping! She went straight over to the food bowl and ate and ate. That was beautiful to watch, made us see why the work we do for these animals, is so worth doing. We all got a bit teary and I wondered if she was feisty after all….

A few days later, I phoned the carer to find out how Babushka was settling in. I was told she was one feisty, cranky girl. Any volunteer that wasn't confident she would charge at,

she would growl, if she heard any noise or anyone came in the enclosure. One volunteer refused to go in there. I had another wombat I was dropping off to the carer a few weeks later, and Babushka, heard my voice, she came out of the enclosure and growled, did her bull stomp thing and shook her heard fiercely at me. That told me she remembered me!

The carer had resorted to anyone that went in to Babushka, must be aimed with a poo scoop, to place in front of them, to hold Babushka back. She was eating well and gaining weight.

Several weeks later I got a call that she was ready for release, and given her crankiness, it would be too risky to keep her in care for any longer. On the way there my hubby and I were planning, how we would capture her from the enclosure, reducing her stress as much as we could and I mentioned how far away, I would be standing upon her release!

Babushka – wild and free! (147)
© Liz McNeil

About 4pm we arrived, to find Babushka, looking healthy and eating in her enclosure, she wasn't the prettiest wombie I've ever seen, she had war scars and torn ears and was the boss. So, we put our plan into action and with lots of growls and snorts we transported her to the release site. We got everything set up, then moved slowly away, within 30 seconds, she came out, she turned looked at my hubby, and I, with what we thought looked like sadness in her eyes! She sniffed at the food and her bedding and began exploring again, stopping to eat every now and then…. I sung the Babushka goodbye song, by Kate Bush and wished her well.

We are all grateful for the experience Babushka gave us, no one got hurt or bitten, and she was saved…. one less victim of the devastating Victorian bushfires.

buddha – a very complicated case

8th November
I received Buddha the Bare-Nosed Wombat into care after he had been in care for approximately two weeks with another carer. The carer noted that it was incredibly difficult to feed Buddha and didn't think that he had gotten enough milk into him during the period he was in care.

On presentation Buddha weighed 1.46kg. He was a bit boney. His abdomen was very, very hard and he was sucking his penis most of the time. Tried to offer a dummy and cover up cloaca, both with no success.


Buddha – looking healthy but is really very sick (148)
© Linda Dennis

9th November
Buddha weighed 1.56kg (different set of scales). Poo very hard, like little pebbles.

Buddha will not drink from a bottle. Feeding him with a syringe, small quantities at a time as he becomes quite distressed when given too much. Only 10mls to 20mls per feed. Feeding every hour or so.

10th November
I noticed that Buddha was having difficulty urinating. A lot of straining with very little output. He was grinding his teeth a lot, indicating pain.

11th November
Buddha weighed 1.57kg.

Started on Bactrim antibiotic for five days. Vet was reluctant to give Baytril as he believed that it can damage growth plates in young animals. Also gave one Vitamin C tablet in water to help dissolve any crystals if there were any. We could not collect enough urine for analysis. Given Pain Stop daily for pain relief.


Buddha ate lots of grass but refused to drink milk (149)
© Linda Dennis

12th November
Started offering Buddha small amounts of Cystitis Relief to help stop urine burning.

15th November
Buddha seemed to be constipated so gave a 9ml enema of water and oil. Pass some softer poo later that day.

Buddha weighed 1.55kg (weight loss).

16th November
Started to flush Buddha with as much fluid as possible to help dislodge any blockage or crystals. Given a total of 123mls, including milk.

After five days of Bactrim there was no improvement so with the vets advice we moved to Baytril (Tim Portas from Australia Zoo advised that it was fine to use in marsupial joeys and was actually quite successful). Baytril injectable given for the next 6 days.

17th November
Buddha weighed 1.59kg. Thought to be water retention and not healthy weight gain.

Offered a total amount of 133mls in fluids including milk.


Buddha even liked his play time (150)
© Linda Dennis

18th November
Buddha's poo is now quite soft and smells a bit peculiar. Not like thrush though. Poo dark green and thick. Although Buddha was reluctant to drink fluids he was keen on eating grass, I believe that the poo change was in relation to the amount of grass he was now eating.

Offered a total amount of 135mls in fluids including milk.

19th November
Buddha weighed 1.61kg.

Offered a total amount of 157mls in fluids including milk.

Was advised by another vet that Pain Stop might actually be making the cystitis worse. Changed to daily Metacam (cat), twice a day. Was told that this might also reduce inflammation in urethra.


Buddha and his buddy Chilli (151)
© Linda Dennis

20th November
Buddha given 10mls of sub-cut fluids.

Visited the vet again to advise that there was no improvement. Buddha given valium to help relax the muscles in the hope that he will pass urine. Didn't work, only made him anxious and bitey for some time. When that wore off he slept soundly for a couple of hours.

During his whole time in care with us Buddha only slept for a couple of hours at a time at the most. Mostly shorter periods. He wanted to be held at all times and only settled when being held. If put in his pouch in the wombat crate, he would wake up, get out of the pouch and scratch at the box. As this was too distressing for him we carried him most of the time.

Offered a total amount of 115mls of fluids including milk. This is all we could get into him.

We were being advised to get in as much fluids as possible but at about this time we wondered if it was actually beneficial. Fluids going in but not coming out – could this lead to damage of the bladder?

Benn Bryant of Western Plains Zoo advised to get an xray ASAP. Asked the local vet but was advised that it couldn't be done as they were too busy and to ring back on Monday to see when he could be booked in. Rang another local vet and was told to call back on Tuesday.

Rang the Koala Hospital and spoke with Cheyne Flanagan. Organised to go to the hospital on the following Tuesday (that was the next day their vet would be available) for a complete host of tests including xrays, ultrasounds, blood and urine.

21st November
Found another vet who was willing to take an xray. I was advised that if the bladder was swollen or extended it would be seen in an xray. Was advised that the bladder was not swollen or extended.

Buddha given 5mls of sub-cuts.


© Linda Dennis (152)

22nd November
Buddha weighed 1.67kg.

23rd November
Rang vet to ask for a sedative for Buddha as he wasn't sleeping soundly. We were going to the Koala Hospital on the following day and wanted Buddha to sleep the night. As he was distressed without our security we had him in his pouch in bed with us and he was keeping us awake most of the night. We wanted Buddha to sleep so we would be refreshed to drive to Port Macquarie from Armidale. Was told that there was no therapeutic benefit so sedation was not approved.

Another vet was in the clinic and looked at Buddha and advised that he probably had a blockage and needed urgent treatment. They wanted to keep him overnight to do some kind of procedure that would cost us $500. I told them that I was going to the Koala Hospital the following day for a host of tests and treatment for free so they decided to try to catheterise him and drain the urine from his bladder.

I left Buddha with them for a couple of hours while they did the procedure.

When I received him back they told me that they were unable to catheterise him although they had tried several times. They thought they saw crystals on the catheter so flushed Buddha with Walpoles solution. 20mls of sub-cuts were given.


© Linda Dennis (153)

They performed Cystocentesis and removed 63mls of urine. I was told that when they removed the needle there was so much pressure that some urine went under the skin when the needle was removed. I was distressed to learn that the two procedures were done without any anaesthetic.

I was told to give 5mls sub-cuts every hour if there was no urine output and 10mls of sub-cuts every hour if there was urine output.

I brought Buddha home and noticed that his abdomen was even more swollen. He started showing signs of extreme pain - hissing and writhing. Urine was seeping out of the hole in his belly. He started gaping for air.

Buddha died painfully, within the hour of bringing him home from the vets.

Autopsy Results

The history and findings post- mortem are most suggestive of a long-term bladder dysfunction, resulting in limited ability to void urine and distension of the bladder. Histology and history indicate that the urethra is anatomically patent, ruling out a stricture.

No evidence of crystals was found histologically or grossly.

It is not surprising that catheterization was challenging- the lumen of the urethra in an animal of this size is very small.

There is no evidence of a bacterial cystitis and changes in the bladder are more indicative of inflammation due to trauma / distension.

In the absence of a visible primary cause, a neurological deficit must be considered likely.

In the absence of proper neurological control, urine accumulates in the bladder and distends it. This can lead to diffusion of toxins through the bladder wall and, in some instances renal compromise, though there was no histological evidence of kidney injury here.

The presence of protozoal cysts in the lung is interesting. These can occur without affect in many cases and their impact on the lung lesion in this case is a bit doubtful. They might, however, offer a possible cause for neurological dysfunction as they can sometimes lodge in brain or spinal tissue.

There was some very minor evidence of inflammation in the brain but no evidence of cysts in the single brain section examined. Toxoplasmosis can occasionally be acutely fatal, especially in marsupials, which have not evolved with this sheep / rodent / cat-spread protozoa.

In addition to being a potential cause of bladder dysfunction, this is also a possible cause of death, or contributor to death in combination with aspects described below, but investigating this will require some more searching through these tissues. In a young animal such as this, a developmental defect also cannot be ruled out as a cause of neurological bladder dysfunction.

Leakage of urine from a cystocentesis site is rare and in this case is probably due to the fatigued state of the bladder as a result of chronic distension (the bladder would normally contract around the needle hole, closing it off).

It is normal procedure to do cystocentesis without sedation or anaesthesia unless the animal is struggling, and cystocentesis would have been a valid course of action in this case - with such a massively distended bladder it is important to both remove the wastes and to remove the pressure on the bladder to allow it to regain its ability to contract and function. *(Note: WPZ later advised Linda that anaesthesia should be given to wildlife for this type of procedure)*.

Leakage of urine into the abdomen is rarely acutely fatal as in this case, though irritation can result in abdominal discomfort.

Me and Buddha (154)
© Linda Dennis

Death from bladder rupture is primarily due to reabsorbtion of toxins from the urine, which normally takes some time to reach toxic levels.

It appears possible that death resulted in this case because the animal already had high levels of toxins in its blood from its chronic urinary tract dysfunction but this cannot be confirmed without serum biochemistry taken close to the time of death.

wombat honey –by helen taylor

Now, this is not wombat country and we rarely see wombats. But last November Robbie and I had two wombat joeys in care (Mr Bumble and Honey).

When we rescued Honey, she had some pretty nasty scabbing on her back which we photographed, not knowing what it was and of course suspecting mange or similar. We asked Donna Stepan about this (Honey and Bumble's next mum) and she said poor little Honey had been beaten up by another wombat.

I thought this only happened between competitive males so I was quite surprised that wombats could be so aggressive towards joeys.

Honey, the Bare-Nosed Wombat – note wound to head (155)

Showing wounds to the rump from territorial aggression (156)

As Honey was found abandoned, we have no idea what had happened, where the other wombats were or how long she had been without her mother. She was very stressed and dehydrated so it could have been some days.

She weighed 1700 grams on rescue but according to Donna should have been well over the three kilo mark judging from her mature appearance.

Linda's Comments: *There may well have been something wrong with Honey and mum may have rejected her resulting in the wounds you see in these photos.*

Or maybe mum had died and Honey was orphaned as a result and she ventured too close to another wombat ~ she could well have been told she wasn't welcome! Wombat's don't see joeys and substitute babies, just as another wombat invading their territory.

rosie's story –by kay muddiman

Rosie is the only wombat in the Southern Tablelands to have had a nose job! Now Rosie was not unhappy with her nose – it was a very nice wombat nose. The only trouble was it developed a lump after she took a tiny bit of skin off trying to escape the carry cage when she first came into care (weight 1600g). The carry cage was completely covered, but that made no difference to Rosie – she continually chewed at the bars every moment she wasn't asleep. Rosie was only the third wombie I had cared for, and my instinct was to confine her to her pouch, but I was advised against this by more experienced wombat carers, who said there was a risk that she would try and claw her way out of the pouch, ripping it in the process and maybe strangling herself. So, I persevered – but Rosie would not settle.

Rosie's initial graze (157)
© Kay Muddiman

She then developed runny poo so whilst at the vets for a faecal float I got him to check her nose. He wasn't unduly concerned, and said it should settle after a while once the graze had healed. The faecal float was clear, so the runny poo was put down to stress. The vet prescribed lectade in between bottles to keep her fluids up, but her poos continually fluctuated from improving one day to deteriorating the next.

The lump getting bigger (158)
© Kay Muddiman

The graze healed, but the lump remained. She then took more skin off the lump (she was still unsettled in the carry cage when awake), so I decided enough was enough, and followed my initial instinct and contained her in her pouch - whilst keeping a very close watch on her. Hey presto, she settled and slept happily from bottle to bottle!

Shortly afterwards we were able to dispense with the carry cage, and put her in a purpose built solid wooden box that my husband had very hastily made for me! We already had a very large wombat box in our roo shed, but Rosie was not yet ready for this.

She settled in her box beautifully, and went along alright for a while, except for the variable poos, but then the poos suddenly deteriorated to water and she became very unwell – so back to the vet for another faecal float. This time she was diagnosed with coccidiosis. I was amazed as she was not yet grazing, but the vet said that she could have ingested the oocytes from her mother's faeces. She was put on .5ml of Amphoprim (Trimethoprim and Sulfadimidine) by injection daily for seven days, after which her poos improved marginally.

By this time the graze on her lump had fully healed, but the lump remained. It was troubling me, so back to the vet. Vet's first diagnosis was fluid, but a needle inserted into it produced nothing but a bit of blood. It was then thought it was probably fibrous tissue, which unless it increased in size and interfered with her vision, would not cause her any problem. So, I was told to wait and see. I wasn't happy with this, but assumed the vet knew best.

While all this was going on her poos continued to fluctuate, and she started chewing and mouthing the teat, and occasionally also grinding her teeth when she did suck. I sought advice from experienced carers and was told it was most likely thrush in her throat and/or gut, (even though nothing was showing in her mouth and the typical thrush smell was not there) and to put her on Nilstat. I did this, but to no avail – the chewing/grinding continued and her poos became very runny. I had got conflicting advice as to the number

of days/times per day to treat her which was worrying, and even my vet could not comment on dosage for wombats. So after a week with no improvement I took her off the Nilstat. Poos continued fluctuating and the chewing/mouthing/grinding on the teat continued spasmodically – however she was otherwise progressing well – energetic, playful, grazing on the grass slabs in her box and putting on weight.

After surgery (159)
© Kay Muddiman

The lump gradually increased in size, but so slowly as to not be obvious at first. Then one day I was horrified to find a couple of other lumps just starting up along from the first one. Alarm bells sounded, and on the advice of our vet we arranged a consultation with the University of Sydney's Avian, Reptile & Exotic Pet Hospital at Camden, where they specialise in our native wildlife. They were great. First they did a hollow needle biopsy (poor girl, it was so painful for her - she made the most dreadful noise while they were doing it, I could have cried for her.) When tested this showed an infection, so they then put her under anaesthetic to do a full biopsy for culture, to determine exactly what type of infection. While doing the biopsy the vet discovered an abscess really deep down. He said that as he cut in for the biopsy, much to his amazement a mass of pus poured out! We were stunned as there was no redness or anything else to indicate an abscess, and Rosie never ever showed any sign of distress with the lump even when we pressed it. The culture took four days to get a result, so in the meantime she was put on Baytril 0.4ml by injection daily for 14 days – plus irrigation of the wound with saline solution for a few days to keep it open and drain it, so that it could heal from the inside out. When the result of the culture came through it showed a staph infection. I was horrified as I always take great care with hygiene.

However the vet at Camden said it's nothing to do with that, they can carry the bacteria on their skin without any effect, it's just when it can get 'in' (such as via her graze) that you have a problem. The good news was that Baytril was right for staph, so we didn't have to start a fresh round of 14 injections of any other medication.

By the time she had finished the injections the wound was healing well, she was pelleting, (I do wonder if it was the staph infection all along that was causing her fluctuating poos/diarrhoea) and she was even more full of beans! Over the next few weeks the wound healed, and the lump gradually went down.

At the time of writing this Rosie is a 12kg healthy ball of muscle and energy – all she has to show for her 'nose job' is a scar, which will probably stay with her for life. She has just transferred, along with her buddy Nelson, to their pre-release carer from where they will in due course be soft released.

So, what did I learn from all this? A LOT!

I learned:

- To listen to advice, but follow your instincts and gut feeling (if I had done this in the first place, the staph infection may have been avoided.)
- It is important to investigate any problem thoroughly - things are not always what they seem.
- An accurate diagnosis is essential before any medication is administered, to ensure correct treatment.
- Not to 'wait and see' for too long.

- If you are not happy with a vet opinion, seek a second opinion - sooner rather than later.
- An animal can be in pain but not show it (you would think the abscess MUST have throbbed, and most likely was the cause of the grinding teeth etc.).
- Never use a carry cage for wombat housing – in future they will go straight into my small wombie box.
- How difficult it is to give a wombat an 'under skin' injection – they are such a ball of muscle and just don't have any loose skin to grab hold of!

At 12kg Rosie only has a small scar (160)
© Kay Muddiman

- I also learned how loving and forgiving Rosie was – no matter what we had to put her through, she always forgave us and was ready for a play and a cuddle. She is quite simply a sweetheart.

the veterinary guide

© Linda Dennis (1)

kim rolls and anne fowler

a note from Fauna First Aid

Within **the veterinary guide** you will find useful information relating to the common diseases found in the Bare-Nosed Wombat. I have been lucky to source two wonderful vets who have put aside their time to write this component of the guide. Many thanks to you, Kim and Anne.

As with **the care guide**, this section will offer a carer several effective ways to manage wombat related issues. Some illnesses, for example Sarcoptic Mange, can be treated effectively using different medications and many veterinarians do use different methods to reach the same goal. Kim and Anne offer advice on how to treat illnesses based on their personal experiences with illness and disease in marsupials – this is not to say that any advice is better than the other – just different – and the information sharing from these two highly experienced vets is complementary.

With this knowledge you will be able to determine the best route to take for you and your wombat. Alternatively, your vet may have different advice again, which you may choose to use.

Kind regards,

Linda Dennis
Fauna First Aid

Fourth Crossing Wildlife
www.fourthcrossingwildlife.com

dedicated to the conservation of Australian native animals....

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coccidiosis – kim rolls

The protozoal parasite *Eimeria arundeli* is associated with enteritis in young wild and hand reared Bare-Nosed Wombats.

Clinical signs & pathology

The oocysts of *E. arundeli* are found in healthy adult faeces. The clinical signs of enteritis are usually only found in sub adults often associated with the onset of grazing (10 months) in wild wombats but much earlier in hand raised wombats. This is probably due to previously unexposed or immunologically naïve animals being subjected to large numbers of infective oocysts on pasture.

(2)

The enteritis shows as mucoid to liquid green diarrhoea with progressive weight loss and bloat.

Post mortem examination shows the gastrointestinal tract distended with fluid and gas with thickened intestinal mucosa.

Diagnosis

This is made by examination of the faeces for oocysts under the microscope.

Treatment

Once clinical signs are apparent treatment can be difficult. Fluid therapy is often required but can be difficult in young wombats and the response to treatment with anticoccidials is not as good in wombats as in other animals.
Toltrazuril (Baycox) is the drug of choice for treatment and is used at 20 mg/kg as single dose by mouth or 10 mg/kg by mouth daily for 3 days.

Prevention

If coccidiosis has been a problem previously in a particular establishment or wombat group then serial examination of faeces can help identify build ups of the organism.

Coccidiostats can then be used to prevent disease occurring. Amprolium is the main drug used here eg Coccivet administered at 15mls/10 litres of drinking water. Toltrazuril (Baycox) can be used also in drinking water as a preventative but is best kept for treatment.

There has been some research to suggest that plasma transfusions to joeys from adult kangaroos may help prevent coccidiosis if given shortly before exposure to contaminated pasture.

coccidiosis – anne fowler

Cause

Coccidia, *Eimeria arundeli*

Clinical signs

Wombat is normal in its behaviour but has had:

- Very watery diarrhoea;

- Gradual weight loss or poor weight gain.

Diagnosis

Examination of faeces under a microscope by veterinarian.

Treatment

Baycox once daily for 2 days, repeat treatment 5 days later. Trimethoprim/sulfa drugs can be used successfully as well at 40mg/kgl. Coccidiostats can be used but antagonise vitamin B12 production in the gut - so supplementation of B12 is needed while on coccidiostats.

Prevention

- Manage pasture – pick up poo.
- Reduce overcrowding and social stressors.

**** Handy tip** – piglet Baycox may be the best one to use as it tastes ok - the poultry one tastes awful! (Anne Fowler calls it exorcist liquid as the animal spins its head around while frothing and screaming obscenities!).

Prognosis

Successful.

constipation – anne fowler

Cause

The large bowel of the wombat is the largest internal organ. It is the organ with the major role of nutrition in wombats. It also resorbs water - so when a wombat becomes dehydrated, it takes water from the food in the large bowel. This reduces the volume of the ingesta, so forward movement of ingesta stops, it dehydrates further and can take up to 10 days to poop!

Constipation occurs with insufficient fluid intake – this can be caused by shock, and lack of water in hand-reared joeys.

Clinical signs

- Small dry pellets (they may take some effort to break open),
- Not pelleting for days.

Treatment

Increase fluid intake as these animals are dehydrated. Dehydration will take at least 3 days and maybe up to 14 days to be remedied. Aim to give 10% body weight in fluid on day 1, 7.5% on day 2 and 3 – only half of this will be met by milk feeding, the rest needs to be given as oral or sub-cutaneoius fluids. (See **hydration** chapter in **the care guide** for more information on hydration).

Oral or cloacal paraffin may help to pass dry faeces but cannot rehydrate the gut. Enemas can also be used, however they are not solving the problem, but may assist in removing faeces in the end of the large bowel.

Some milk formulas also make dehydration worse as carers forget it is a food, not fluids. It is important to also offer water to a wombat joey throughout its care.

cystitis and bladder stones – anne fowler

Cause

Inflammation of the bladder lining. Dehydration is primary cause but cystitis can occur as a potential complication after diarrhoea. The animal does not obtain sufficient fluids (due to increased loss from the diarrhoea not being replaced). This means that the urine is concentrated and the bladder is not flushed. So bacteria may ascend up the tube from the outside into the bladder. The cloaca, with its common opening to faecal and urinary systems can predispose to this.

Clinical Signs

- Straining to urinate,
- Blood in urine,
- Hunched,
- Quiet,
- Tooth-grinding due to painful abdomen.

Diagnosis

Urinalysis by the veterinarian may show evidence of infection (blood and crystals) Note that herbivore urine is normally alkaline, unlike dogs and humans.

Treatment

Increase fluid intake to flush the kidneys and bladder – aim to give 10% bodyweight in fluids daily (includes milk intake) for three to five days.

Antibiotics may be indicated if evidence of an infection is present. Administering acidifying agents is contraindicated, acidifying the urine will cause the natural excretion products (calcium oxalate) from a herbivorous diet to solidify into bladder stones.

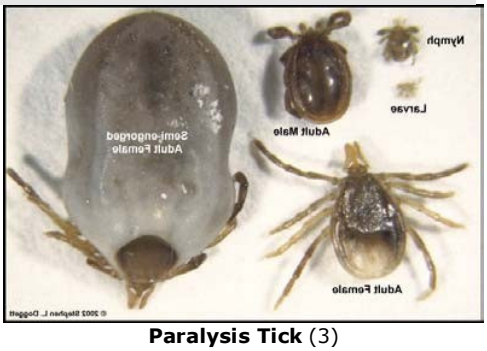
Prognosis

Good with prompt treatment.

ectoparasites – kim rolls

As well as the Sarcoptic mange mite there are a number of other species of mite (including ear mites), ticks, fleas and lice which are sometimes found on wombats.

These are usually of little significance and can be easily controlled using commonly available topical preparations such as Malathion.



Paralysis Tick (3)

endoparasites – kim rolls

Numerous tapeworms and nematodes are associated with wombats though rarely cause problems. Some of the tapeworms can cause mild bile duct disease and the strongyloides spp of nematode are occasionally associated with mild enteritis.

Liver fluke may cause chronic liver disease in Bare-Nosed Wombats living in swampy areas.

Tapeworm (4)

Roundworm (5)

hypervitaminosis D – anne fowler

Cause

This disease has been associated with the feedings of diets high in vitamin D, for example dry dog food, human bread.

Clinical Signs

- The animal appears lame and with signs of kidney failure.
- Calcification in the feet, heart and kidneys occur inside the body.

Diagnosis

Based on history and clinical signs – Radiographs of feet show extra calcium deposits.

Treatment

Feed a diet low in vitamin D – no dog food. Decrease exposure to sunlight.

Prognosis

Guarded once lesions are present as they cannot be removed.

hypoglycaemia – anne fowler

Cause

- "Marsupial Stress Syndrome". It is a reaction to the change from natural pouch to changing temperatures, intermittent feeding and stress.
- Poor husbandry leading to poor condition.
- As a result of infection stopping food absorption.
- Emergence from pouch is associated with enormous increase in energy expenditure – sometimes the diet cannot meet this need.

Clinical signs

The animal may appear quiet, weak, uncoordinated, have convulsions and at worst, lapse into a coma.

Treatment

- 10ml/kg of 10% **Glucodin** by mouth.
- Feed every 2 hours, keep warm, and treat other diseases.
- Severe dehydration may be corrected with subcutaneous fluids such as 0.9% saline or Hartmans or a saline/glucose mixture.
- Slow down pouch emergence and limit exercise.
- Add **Megaderm** to milk to increase energy in the milk.

inhalation pneumonia – anne fowler

Cause

- Systemic infection localises in the lungs. For instance, a severe bacterial diarrhoea causes bacteria to enter the bloodstream and lodge in the lung tissue.
- Inhalation of milk or food particles into the breathing tube - this can occur with:
  a. feeding a cold, dehydrated animal before it is warmed and rehydrated
  b. too big a teat hole.

  The food acts as a substrate and permits bacteria to grow.

Clinical signs

Not eating, losing weight, vaguely 'not right'. Progresses to nasal discharge, fever, rattly breathing.

Prognosis is poor once the noisy breathing and nasal discharge are present.

Diagnosis

X-rays may show lung consolidation. Blood work shows systemic infection. Clinical signs include seeing nasal discharge.

Treatment

- Rehydration.
- Treat with systemic broad-spectrum antibiotics for at least 7 days.
- Nebulisation and very gentle percussion may assist.

nutritional diseases – kim rolls

1. **Multisystemic Mineralisation Syndrome**

Aetiology

This disease occurs in captive Bare-Nosed Wombats and is characterised by mineral deposits in the main blood vessels, heart, kidneys and foot pads.

The cause of the disease is not known but a number of possibilities are put forward.

- Vitamin D toxicosis either associated with increased skin synthesis due to forced daytime activity in captivity or as a result of inappropriate diets such as dry dog food. Wombats are thought to require less Vitamin D than other marsupials.
- The primary lesion may be chronic interstitial nephritis (kidney disease) which leads to malabsorption of calcium from the gut, mobilisation of calcium from the bones and subsequent calcification of soft tissues.

Clinical signs

The clinical signs of this disease are usually swollen, red and hot lesions of the footpads and associated lameness. This often progresses to signs of kidney failure such as polydipsia, polyuria, weight loss and anorexia.

Treatment

Surgical treatment of large footpad lesions has been tried but usually not very successfully.

Blood tests and kidney biopsies can be used to determine the degree of kidney damage. Wombats with severe kidney damage should be euthanased. If the kidney damage is mild then strict adherence to proper high fibre, low protein diet may ameliorate clinical signs with time.

2. Bloat

The clinical signs of bloat are a distended abdomen, abdominal pain (stretching of hindlimbs and grunting) and flatulence.

This is usually due to an inappropriate diet which is too high in energy and carbohydrate. High quality lucerne and fruit particularly can cause this problem.

Treatment is correction of the diet and short term use of antiflatulence medications such as Mylanta usually suffice. In severe cases administration of injectable gut stimulants may become necessary.

© Carol Pullar (6)

3. Overgrown & Fractured Teeth

As wombat teeth have no true roots and are continually growing they are subject to overgrowth and malocclusion largely as a result of insufficient wear.

A coarse fibrous diet and branches to allow bark chewing in captivity help to prevent this.

Fractured teeth are common after car trauma.

Because wombat teeth have no pulp cavity they can be filed back or clipped as necessary though it is usually necessary to give a general anaesthetic especially when molar teeth need attention.

Please see an unwell adult wombat in the care guide for a photo and more information on this wombat. (7)
© Cara Lee

poisoning – anne fowler

It is legal to poison (and shoot) wombats in some areas of Australia.

Cause

1080 in carrots, rat bait

Clinical signs

Sudden death, convulsions, pale gums

Treatment

Usually unsuccessful due to advanced stage.

sarcoptic mange – kim rolls

Aetiology

Sarcoptic mange is caused by the mite *Sarcoptes scabei var wombati*. This mite affects the Bare-Nosed Wombat throughout its range, occasionally the Southern Hairy-Nosed Wombat but apparently not the Northern Hairy-Nosed Wombat.

The host specificity of the mite is still debatable but probably affects dogs and foxes.

Transmission is through contact between animals or by contaminated burrows and rubbing sites. The mite lives only a few weeks in the environment in the right conditions. The relatively stable low temperatures and high humidity of wombat burrows are ideal for mite survival and transmission.

The role of foxes in the transmission and maintenance of mange in the wombat population is unknown however they are not always necessary as mange occurs in wombats in Tasmania and Flinder's Island.

© Lenore Taylor (8)

The disease is enzootic in some populations with epizootics appearing sporadically which may have contributed in the past and could in the future to the demise of remnant populations.

Sarcoptic mange may have been introduced to the wombat population by the dingo or fox.

The prevalence of mange appears to increase in times of nutritional stress (eg drought or winter) and in high population densities. It is also possible the higher prevalence in winter may be due to increased survival time of the mite off the host.

Clinical signs

The mites burrow deep into the keratinising layers of the epidermis causing severe pruritis, hyperkeratosis, acanthosis and alopecia.

Usually the first sign of mange is thickened skin on the head then progressively to thickened crusty skin on the shoulders, flanks and limbs. The hyperkeratotic skin may crack deeply into the dermis allowing secondary myiasis (flystrike) or bacterial infection.

Some wombats become so severely affected that mastication and vision can be impaired. Death can then result from secondary infection, starvation or dehydration.

© Carol Pullar (9)

Sometimes the severe skin lesions associated with sarcoptes occur very rapidly with only a few mites and the clinical signs here are attributed to a hypersensitivity reaction to the mites.

The sarcoptes mite can transfer from wombats to humans causing itchiness and reddened papules usually on the hands and arms or chest if nursing young wombats as the mite can move through clothing. The infection in humans is usually transient and self limiting though occasionally needs treatment.

Diagnosis

Diagnosis is made from the typical clinical signs and identification of the mite microscopically in skin scrapings or crust samples.

Treatment

Treatment needs to be instigated early in the course of the disease. Prior to treatment consider the availability of suitable habitat for release as severely affected wombats often become reinfected providing a source of mites to the population it is released into. Euthanasia should be considered in all severely affected wombats on humane grounds both for the individual and the population as a whole.

In mildly affected wombats Amitraz in a 1.25% solution as a wash or dip every 7 to 10 days for 4 treatments is often effective. Keratolytic shampoos may help the effectiveness of the acaricidal washes if used beforehand to loosen crusting.

Ivermectin can be used in moderately affected wombats either as a pour on or injected subcutaneously at 200 – 300 mcg/kg at 10 day intervals for 5 or 6 treatments.

Wombats with secondary infection and self trauma due to scratching may need antibiotic treatment.

sarcoptic mange – anne fowler

Cause

This mite (*Sarcoptes scabei*) is not fussy on whom it lives. It invades the top skin layer. Eggs laid hatch 42 days later.

I think that we see sarcoptic mange in two presentations:

- hand-reared orphan - can come in with it, and due to stress of rearing may manifest it, so products like Impact may help to boost immunity in these animals. Treatment can be attempted, but be aware that they may be genetically 'doomed' to fail from the infection. We are seeing genetic selection at work with this disease - we want a population of wombats that have learned to deal with this parasite.
- adult - attempt treatment once on wild animals, if the disease reoccurs, euthanasia is recommended. Ivermectin or Cydectin (lasts for longer as a pour on, ie weeks rather than days) can be attempted.

Transmission

Spread through direct contact, for example, in shared burrows with foxes or other wombats. Humans are natural hosts and thus carers can spread from one wombat to another.

© Anne Fowler (10)

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Clinical Signs

- Itchy,

Hairless,

- May become unable to see or hear,
- Deep crusty fissures in the skin,
- Weeping sores,
- Seen feeding during the day and thus become road trauma victims.
- Mild signs seen in hand-reared young: itchy and red.

Sequelae

Die from starvation, or misadventure due to blindness.

Diagnosis

Often made on appearance. The vet may see mites under the microscope from a skin scrape.

Treatment

Medication	Treatment
Amitraz	1.25% solution every 10 days for 3-4 treatments
Ivermectin	1% 0.3mg/kg by mouth / injection, repeated each 10 days for 3 months (ie 2 x lifecycles of the mite).
Moxidectin (Cydectin)	has been used well as a pour on.
Selamectin (Revolution)	is a dog / cat spot-on applied to the back of the neck monthly for 3 months. Works well for joeys and is very safe.

Address secondary bacterial infection with antibiotics. Improve nutrition as the exudate takes protein from the body. Severely affected cases should be humanely euthanased.

Prognosis

The unfortunate fact with this disease is that wombats have yet to adapt to this fox parasite. In time, more resistant wombats will survive. Release of wombats with mange is negligent and shows a lack of concern for the health of wild healthy populations. Pouch young can be successfully treated. However they are more likely to succumb to the disease after release.

tooth malocclusion – anne fowler

Causes

- Vehicle trauma may damage the roots and alter the direction of growth
- Lack of grass and hay in the diet may preclude adequate wear.

continued over page.

- Teeth grow continuously through life – small changes when young may impact severely when older.

Many museum skulls have evidence of dental disease and malocclusion.

Treatment

Veterinary assistance to burr teeth back into alignment can be attempted.

Prevention

Ensure that wombats are consuming majority of diet as hay and dried grasses. Thoroughly check the mouth of all road-trauma orphans.

Prognosis

If the root direction has altered, this change is permanent and prognosis is poor for normal tooth wear.

toxoplasmosis – kim rolls

Aetiology

Toxoplasma gondii is a coccidian parasite which affects a broad range of animals and humans but marsupials are particularly susceptible.

The definitive host is the cat which picks up the organism from mostly rodents and shed oocysts in their faeces which become infective after 24 to 96 hours. Wombats become infected when they ingest these oocysts. Immature stages called sporozoites are released from these in the wombat's intestine where they replicate in the intestinal tissue and associated lymph nodes.

As these organisms replicate further they spread as tachyzoites through the circulatory system and form cysts in various tissues, most commonly the brain, liver, lungs, eye and muscles. These cysts can then lie dormant or release new organisms which then restart an active infection.

Clinical signs

Toxoplasma gondii infection is usually unapparent but clinical illness is common in hand reared and immunosuppressed animals. Management factors, particularly nutrition and provision of psychological needs are important factors in this disease.

In the wombat signs are usually associated with central nervous lesions, the lungs and liver. There are a huge range of signs including depression, ataxia, anorexia, fever, paralysis, convulsions, ocular problems including cataract, diarrhoea and vomiting. The severity of the illness can be from very mild to sudden death.

Diagnosis

This is best made by detecting rising antibody titres in serial blood samples or by histological examination of post mortem tissue.

Treatment

Treatment of toxoplasmosis is with drugs that retard multiplication of the parasite rather than killing it so a positive outcome relies on the wombat having a well functioning immune system. This means good nutrition, stress free environment and freedom from concurrent diseases.

The main drugs used are sulfadiazine 30 – 60 mg/kg per os (by mouth) twice daily in combination with pyrimethamine 0.25 – 0.5 mg/kg per os twice daily.

Folinic acid 1mg/kg/day or brewers yeast 100mg/kg/day should be given with this treatment to help prevent anaemia.

Clindamycin can also used to treat toxoplasmosis.

Prevention

The only preventative measure really for toxoplasmosis is to prevent young susceptible animals from being exposed to large numbers of infective oocysts.
Therefore effective cat control and proper food storage are paramount.

toxoplasmosis – anne fowler

Cause

The protozoan *Toxoplasma gondii*. Part of its life cycle must go through a cat. Marsupials eat grass or feed contaminated by cat faeces. As marsupials evolved without cats, they are at high risk.

Transmission

Eat oocyst found on ground, in soil or on grass. East grass / vegetables contaminated with cat faeces.

Clinical Signs

- Quite,
- Bloody diarrhoea,
- Pneumonia,
- Convulsions and paralysis,
- Sudden death

Treatment

Usually too late as significant brain lesions are present.

Clindamycin is an antibiotic that can be tried. However, the damage is done by the bodies reaction to the parasite – and this may remain unchanged despite treatment.

Prevention

Keep cats off grazing pasture.
Keep cats away from stored feed.

trauma – kim rolls


© Carol Pullar (11)

Unfortunately car trauma is a common cause of injury and death in wombats.

Animals not killed outright generally have either spinal injuries, pelvic fractures or concussion.

Because adult wombats often fast in captivity, injuries requiring long term treatment and care often end in disaster. Concussion and minor injuries which can be treated quickly and the animal released with 2 or 3 days are much more rewarding and worthwhile treating.
Dependent young from female road accident victims can respond to care if found quickly. Often they are not found until weak from dehydration and starvation. Some of these can be saved with fluid therapy but the death rate is high.

trauma – anne fowler

Vehicle trauma is the most common reason for presentation and orphaning.

Clinical Signs

Concussion, fractures, paralysis and internal damage can all occur.

What to look for

- Lameness, not willing to use leg
- Concussion is seen as depression, blindness and coma
- Evidence of blood – on limbs, nose, lips, etc.

Diagnosis

Vet x-rays under anaesthesia to determine extent of damage.

Treatment

Depends on injuries. Treat shock. Keep warm, dark and quiet. Restrict movement, and bandage broken limbs where possible.

Prognosis

Dependent on injuries – fractured bones are difficult to heal in wild adults. Adult wombats can make difficult patients to treat without suitable facilities.

the naturopathic guide

© Anne-Marie Dineen (1)

anne-marie dineen

a note from Fauna First Aid

Within **the naturopathic guide** you will find natural remedy information relating to the diseases found not only in the Bare-Nosed Wombat, but in many of our Australian native animal species.

Many wildlife carers consider that in some circumstances Western Medicine is too harsh for native animals, and believe that a more natural approach is suited better to the sensitive immune systems of Australian fauna. Others, while believing that Western Medicine is the only viable treatment, still use natural remedies as a complement to stronger medications.

Anne-Marie Dineen has been caring for native wildlife since 2002 and has been involved in naturopathic remedies since 1990. Within this guide Anne-Marie shares her vast knowledge and experience with alternative treatments so that Australian native animals can receive the best possible treatment during any medical crisis.

Anne-Marie does not oppose the use of Western Medicine – quite the opposite - and recommends first and foremost that an animal be accessed by a veterinarian. She also advises that a qualified natural therapist – like herself - be consulted prior to any use of natural remedies. The remedies found within the guide are not designed to completely *replace* orthodox medicine - although in some circumstances natural remedies can result in complete cure - but to *enhance* conventional medicine with quality natural remedies.

Anne-Marie's philosophy on the treatment of native animals is an holistic approach – to treat the whole body and not purely the illness.

the naturopathic guide opens a new door for wildlife carers - offering advice on proven alternative remedies and providing carers with even more choices for the quality care of Australian native animals.

Kind regards,

Linda Dennis
Fauna First Aid

Fourth Crossing Wildlife
www.fourthcrossingwildlife.com

dedicated to the conservation of Australian native animal....

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introduction

With a background in horticulture I spent many years growing and using medicinal herbs which led to a thirst to expand my knowledge and to my subsequent studies in Herbal Medicine and Naturopathy. I qualified as a Medical Herbalist in 1999 and completed my Naturopathy studies in 2000.

When I began caring for injured and orphaned wildlife in 2004 it was second nature for me to reach for herbal and nutritional remedies for many of their ailments. I was delighted with the results and soon other carers were asking for my remedies. Although I have over 400 human clients on my books I spend a lot of time making remedies for wildlife and send them all over the country.

I live on 300 acres which we have turned into a nature refuge. I raise mainly macropods from the pinkie stage through to release. We are lucky to be able to release many of the animals on our property.

holistic healing for animals

One of the joys of using natural therapy for animals, is that the remedies were tested and proven on humans before they were used with animals. This seems to redress the balance somehow for all the suffering inflicted on animals over the years in evaluating orthodox medicines and drugs.

importance of nutrition

Feed only the best quality food.

Find out about the animal's natural diet in the wild and try and provide a diet as close to that as possible.

By attending workshops you will find out more about the care, diet, and behaviour of various types of wildlife.

© Linda Dennis (2)

importance of obtaining a veterinary diagnosis

© Linda Dennis (3)

If an animal that comes into your care has any injuries, it should be assessed by a vet. It may need treatment for shock, or need surgery. There may be internal injuries that cannot be easily detected. If an animal develops an illness while in your care, it is equally important to have your vet assess it. We are very lucky that we have experienced wildlife vets that we can consult, free of charge at the Australia Zoo Wildlife Hospital on the Sunshine Coast. I do not charge a fee for wildlife consults, and offer a discount on any medications used. Please, if possible see your vet before making an appointment to see me.

After visiting your vet and obtaining a diagnosis, you may decide to opt for natural health treatments, or a combination of both natural and orthodox treatments.

why consult a professional health practitioner

Just as important as it is to consult a vet for a professional diagnosis, it is equally as important to consult a professionally trained natural therapist if you intend to treat an animal with any illness using holistic methods. When approaching the question of holistic care, it's important to realise that we seek not merely to replace the orthodox vet's synthetic tablets with herbs and vitamins.

Physical, emotional, environmental and nutritional factors all come into play when evaluating a case. We need to look at the whole picture of an illness and find therapies that treat the whole body.

Since the majority of wildlife carers who contact me do so because the animal in their care has diarrhoea then this is a subject I shall address first.

diarrhoea and digestive upsets

Since 2004 I have been successfully using my herbal formulas and nutritional supplements to treat animals in my care who have presented with various digestive disorders. I have also successfully treated hundreds of other carers animals, particularly for thrush and e-coli. It has been my experience that macropods such as kangaroos respond very well to herbal treatment. Eastern Grey Kangaroos in particular, who are very easily stressed are prone to Candida and E-Coli and a host of other digestive disorders. I advise carers to get a faecal sample analysed by their vet or pathology dept at the onset and end of treatment in order to identify the pathogens we are dealing with. This information ensures that I use the most appropriate herbs and the follow up faecal test confirms the success of the treatment. Carers call me every 2 days or sometimes daily in order for me to review the animals symptoms and alter the dose rate as required. This service helps many carers who do not have easy access to vets with wildlife experience and many carers also live in remote areas where reaching a vet is not possible. Sometimes it is impossible to transport an animal to the vet as in the case of adult kangaroos.

Although I have labeled one of my formulas Thrush Formula, it also treats a wide variety of pathogens. If e-coli has been diagnosed or suspected then I also prescribe my e-coli treatment. If diarrhoea has only just commenced and there is no smell associated than I recommend a product called **SB FlorActiv:** a biotherapeutic supplement featuring *Saccharomyces boulardii* – a clinically proven agent that competitively inhibits Candida albicans and stimulates secretory IgA production

How Does SB Inhibit Candidiasis?

Saccharomyces boulardii is a probiotic, non-colonising yeast species which is not related to the Candida spp. SB quickly establishes itself in the GIT. On cessation of therapy it is no longer detectable after 2-4 days. SB produces lactic acid and B vitamins, and as it becomes established, crowds out unfriendly strains of yeast. When given along with probiotic bacteria, SB provides a symbiotic treatment regime for the gastrointestinal tract

Herbal formulas
One of the herbs in my formula, Citrus seed extract is broadly active against both fungi and bacteria (and research has also suggested protozoa). Hence, it will not create favourable conditions for fungal growth, unlike conventional antibiotics which have selective antibacterial activity.

By lowering the total count of harmful organisms in the gastrointestinal tract, regrowth of beneficial flora will be enhanced provided other conditions are favourable**.**

Some of the Bacteria and Fungi found to be susceptible to Citrus Seed Extract are as follows.

Bacteria
Escherichia coli
Salmonella typhi
Salmonella anatum
Salmonella cholerasius
Staphylococcus aureus
Staphylococcus pyogenes
Streptococcus faecalis
Corynebacterium spp.
Proteus Vulgaris
Bacillus subtilis
Mycobacterium spp.
Pasteurella multocida

Fungi
Aspergillus flaves
Aspergillus niger
Aspergillus orzae
Penicillium citrium
Penicillium spp.
Candida albicans **–** Thrush, one of the most common ailments that affect our macropods

Diarrhoea is commonly caused by: Candida albicans and E-Coli but can be for a variety of reasons including STRESS.

These can lead to many other manifestation of chronic ill-health.

As carers we need to be aware of the causes of stress and do everything in our power to minimise stress to the animals in our care.

Photo at right: Joey with typical thrush symptoms - yellow, bubbly, sweet smelling faeces.

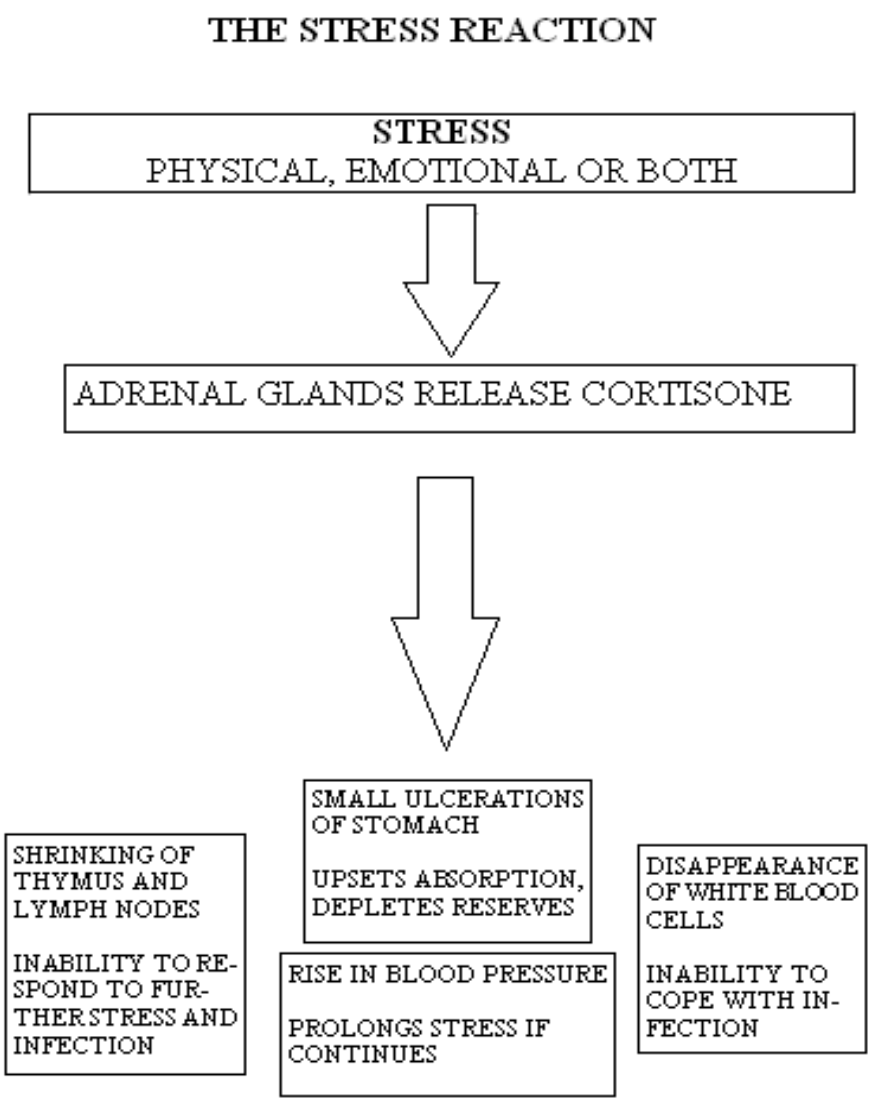
Joey suffering from thrush (4)
© Anne-Marie Dineen

Case Study

1 Eastern Grey and 2 Western Grey 3kg joeys with thrush. Above treatment followed. All animals back to good health within a week. Carer reported that one of the animals had been in poor health since coming into care as a pinkie. After the treatment the animals health was vastly improved and the animal then appeared to thrive.

Eastern Grey Joey suffering from thrush (5)
© Anne-Marie Dineen

stress – the big killer!



This chart will give you some indication as to why it is so important to minimize stress

supplements to help alleviate the damage caused by stress

- **Vitamin E –** Primary function is as an antioxidant, protects tissues and cells from free radical damage, useful in helping to prevent myopathy
- **Selenium –** Antioxidant, maintenance of cellular membranes, works synergistically with vitamin E to carry out antioxidising and immunostimulating actions. Vitamin E and Selenium function better together rather than individually; however their functions are not the same
- **Rescue Remedy -** For use in any emergency, great or small. Use after any accident to treat shock, fear, terror and panic. Will help to relieve fear and restore calm. Use 1-3 drops depending on size of animal. Also available as a spray.

supplements to improve the immune system

As indicated by the diagram on stress the immune system is considerably compromised and leads to illness if stress prolongs.

- **Colostrum** contains large numbers of antibodies called "secretory immunoglobulin" (IgA) that help protect the mucous membranes in the throat, lungs, and intestines of the animal. Leukocytes are also present in large numbers; these protect the animal from harmful viruses and bacteria. Ingesting colostrum establishes beneficial bacteria in the digestive tract.

- **Uncaria tomentosa** is one of the most important plant medicines of the Ashaninka Indians, the indigenous people of the Peruvian central rainforest.

  Actions **–** Immune enhancing, anti-inflammatory, antioxidant.

  Therapeutic Indications **-** acute and chronic infections; chronic immune deficiency disorders. Chronic inflammatory conditions including gastritis.

- **Ocimum tenuflorum** is regarded as a sacred plant in Hindu culture, it has demonstrated immune stimulating activity and adaptogenic activity from oral administration in experimental models. Improves physical endurance, prevents stress-induced ulceration, normalises plasma corticosterone and stimulates humoral immunity

- **Andographis paniculata** is grown in gardens in India where it is highly valued by the local people as a medicine. It is an ideal herb for treating acute conditions. It has shown immunostimulant activity for the treatment of bacterial and viral infections.

- **Echinacea**, **angustifolia** and **purpurea** has a long history of use amongst Native Americans, particularly the root, which was used for toothache, sore throat, fits, stomach cramps, septic conditions, rabies and as an antidote for venomous bites including snakebite. The roots of Echinacea have been shown to possess immune-enhancing activity, as measured by increase in phagocytic activity in vitro and after oral administration in an experimental model. Echinacea has shown antiviral activity against several viruses. Internal and external use of Echinacea reduces inflammation, oedema, subcutaneous haemorrhage and improves healing of damaged tissues.

Again I must stress that herbs should only be prescribed by a qualified health practitioner.

supplements to improve gut flora

- Probiotic bacterial cultures are intended to assist the body's naturally occurring flora to re-establish themselves within the digestive tract. They are sometimes recommended by doctors, and, more frequently, by nutritionists, after a course of antibiotics, or as part of the treatment for candidiasis.

  Several friendly intestinal bacteria perform many important bodily functions. Various cultures of acidophilus are available as powders, capsules, tablets and liquids and measured by the amount of viable bacteria per dosage. Acidophilus itself acts as a mild antibiotic – that is, it has antibacterial activity. Helps in the production of some B vitamins and vitamin K, and in the breakdown of food. Can be used on a weekly basis to maintain a healthy gut.

Other Treatment Options:

- **Charcoal and Peppermint capsules**. May be added to bottle.

- **Probiotic powders** to repopulate the gut flora.
- **Slippery elm** for inflammatory conditions of the digestive system, including diarrhoea. This herb puts a soothing coat on inflamed mucous membranes from mouth to anus. It can also be made into a paste and used for bites, boils, abscesses and ulcers.
- **Chamomile** can be given as a tea for inflamed digestive system. You can make an infusion and use this water to make up milk formula.
- **Parsley** can be used for flatulence and colic.

Herbal Formulas

Normally I use 5-6 herbs in any given formula and tailor the formula according to individual need, but also have a standard Thrush and E-coli formula. All herbals also contain at least one immune stimulating herb.

Homeopathic Nux vomica for digestive upsets, wind, indigestion, vomiting and irritability

Case Histories

2kg Redneck Wallaby presented with bubbly, sweet smelling diarrhoea. Treated with SB FlorActiv and probiotic powder. Symptoms improved just hours after first dose and within 4 days symptoms were completely eradicated.

10kg Eastern Grey. Diarrhoea for several days. Carer had already used inner health and charcoal to no avail.

I prescribed a herbal formula for diarrhoea containing
- Meadowsweet: to soothe the gut
- Golden Seal: anti-pathogenic and repairs mucous membranes
- Ladies Mantle: astringent
- Cats Claw: anti-pathogenic, immune enhancing
- Agrimony: astringent
- Licorice: soothing, anti-inflammatory, helps make the herbal more palatable

Also advised carer to administer bentonite clay. This animal had not been seen by a vet. Initially the joey responded to herbal and improved, but relapsed a few days later. Joey was assessed by a vet and e-coli was diagnosed. The medication used to treat the e-coli, killed that bacteria but also the beneficial gut flora, and the animal then came down with thrush. This could have been avoided if the joey's condition had been correctly diagnosed. Had I know it had e-coli I would have treated it with different herbs including Citrus seed extract, which is very effective in treating e-coli. This case highlights the need for a competent veterinary diagnosis, including faecal testing.

Bentonite for Diarrhoea in Mammals

Bentonite is not a mineral but a commercial name for montmorillonite, the active mineral in many medicinal clays which come from weathered volcanic ash. This name derives from Montmorillon, France, where the medicinal mineral was first identified. Sometimes mineralogists also use the term smectite.

A VOLCANIC DETOXIFIER – Bentonite, a medicinal powdered clay is one of the most effective natural intestinal detoxifying agents available and has been recognized as such for

centuries by native peoples around the world. Whatever the name, liquid clay contains minerals that, once inside the gastrointestinal tract, are able to absorb toxins and deliver mineral nutrients to an impressive degree. Liquid clay is inert which means it passes through the body undigested.

A medicinal study by Frederic Damrau, M.D., in 1961 (Medical Annals of the District of Columbia) established clearly that bentonite can end bouts of diarrhoea. When 35 individuals (average age 51) suffering from diarrhoea took two tablespoons of bentonitein distilled water daily, the diarrhoea was relieved in 97% of the patients in 3.8 days, regardless of the original cause of the problem (allergies, virus infection, spastic colitis, or food poisoning). According to Dr. Damrau, bentonit is "safe and highly effective" in treating acute diarrhoea.
Technically, the clay first adsorbs toxins (heavy metals, free radicals, pesticides), attracting them to its extensive surface area where they adhere like flies to sticky paper; it then absorbs the toxins, taking them in the way a sponge mops up a kitchen counter mess.

Bentonite is available from me or you stock feed vendor.

Instructions for use:
Mix 1 tsp in 100ml hot water and let steep for 5 minutes. The grey water on top is what you want and you add 1ml per 100ml milk formula.

treatment regimes for ailments using natural therapies

Abscesses

Use one drop tea-tree oil on the abscess, then when the pus has dischargedwell, clean with salt water and put 1 drop lavender in a base oil such as olive oil.

Avian Pox

Ointment containing: Olive oil, Beeswax, Hypericum infused oil, Hypericum fluid extract, Thuja, Lemon Balm, Citrus seed extract. Apply 3-4 times daily to affected area

Orally – 4 drops daily of Hypericum and Golden seal formula.

Case Study

Crested Dove treated with above. Symptoms abated after 24 hours. Completely recovered and was later successfully released.

Bacterial Infections

Herbs versus Antibiotics: There are many situations where a herbal formula can be used instead of antibiotics thus avoiding the destruction of gut flora and / or gut discomfort and very effectively killing the pathogen.

Anti-microbial herbal formulas, in place of antibiotics, and without the adverse affects on the gut may contain some of the following

Uncaria tomentosa
Pau D'Arco
Allium sativum
Azadirachta indica
Hydrastis Canadensis
Echinacea

In case of emergency when no vet is available, **Yarrow** can be used for deep wounds, rashes, deep punctures. Can be used as an infusion to irrigate the wound, or as a cream,or both. Seek veterinary advice as soon as possible.

Colloidal Silver - bacterostatic.

Add 4-5 drops to 250ml water and let stand for 30 minutes. Can be added to water bowls but ensure pure water is also provided. Can be used as an adjunct in the treatment of bacterial disease and also as a preventative agent.

Bites

Homeopathic Hepar sulph for abscesses, cat or dog bites. Use if you think pus is starting to form, if there is sudden discharge or if an area is looking swollen, red or painful. Also used for infected wounds.

Homeopathic Ledum, pillules or liquid.

Bruising / Sprains and Strains, Soft Tissue Injury / Inflammation

Homeopathic Arnica in pillules or cream. Arnica is the first remedy for bruising, shock, accident or injury, stings, sprains and strained muscles. Helps with post operative bruising. Don't use Arnica ointment on broken skin.

Traumeel is a homeopathic preparation for any soft tissue trauma. Contains Arnica and many other anti-inflammatory substances. Available as tablets or cream.

An effective alternative to NSAIDS.

Traumeel is supported by over two dozen scientific and clinical studies.

I find this product invaluable for joeys with bruising and other soft tissue injury.

Cream can be used topically and crushed tablets mixed with milk formula.

CAUTION: Do not use on broken skin.

Red-Necked Wallaby being treated for bruising (6)
© Anne-Marie Dineen

At right is a picture of Teenie a 200g Red-Necked Wallaby who came into my care late one winter night. She had been thrown from the pouch and sustained massive bruising over most of her body including the palms of her hands. She was very cold on arrival. Once she had been warmed in the incubator for a few hours I administered Traumeel with glucose and water. Teenie was in care until her successful release and has since gone on to have her own joey.

Case Study

Mountain Brushtail Possum with badly sprained front limb. Swollen, hot, and obviously painful to touch. Traumeel tablets administered three times daily dissolved in milk formula. Condition fully resolved within 24 hours and joey was back climbing trees.

Burns

Celloids PCIP every 2 hours, also applied topically, mix with aqueous cream, cover with gauze. Topically you can use any one of the following:

Hypericum oil

Aloe vera

Calendula cream

Manuka honey applied to burn and covered with cotton bandage.

Homeopathic oral dose of Arsenicum album 30c, Aconite 30C.

Orally: Vitamin A, Vitamin E, Vitamin C to speed up healing.

Eye Inflammation

An infusion of Eyebright and Chamomile can be used to bathe sore and inflamed eyes.

Ear Mites

Neem

Case Study

Redneck wallaby with mite and dry fungal condition in ears. This was diagnosed by vet from a scraping taken from ear.

Treatment

Neem and Pau D'Arco with homeobotanical S mixed into an aqueous cream. Applied twice daily to ears. Condition resolved within 24 hours. I continued to use the cream for another week to ensure no recurrence.

Fractures

Must be properly assessed and treated by a vet.

Comfrey speeds wound healing and guards against scar tissue developing, can also be used for external ulcers.

Can be made into a cream or ointment. Leaves can be fed to animal.

Extra calcium can be given to improve healing.

Swamp Wallaby with a broken limb (7)
© Terri Eather

Itchy Skin Conditions

Chickweed for itchy skin conditions, external remedy for cuts, wounds, especially with itching and irritation.

Can be made into an infusion and used as a wash, or the infusion can be used to make up the milk formula.

Can be fed fresh to animal.

Can also be made into an ointment or cream.

Bare-Nosed Wombat with bacterial dermatitis (8)
© Linda Dennis

Nerve Damage

Hypericum in tincture or homeopathic form, for injuries where the nerves are affected, post op pain, spinal injuries, puncture wounds and injuries to toes and tails.

Can also be used as an ointment. Traumeel tablets are also very effective in these situations.

Chamomile – gentle sedative, for anxiety - analgesic, speeds wound healing.

Bush Turkey with paralysed legs (9)
© Anne-Marie Dineen

Parasites (Internal)

Wormwood for worm infestation, fever and infections.

Paracea is a product which combines wormwood, citrus seed extract and black walnut.

You can also use Homeopathic and Homeobotanical preparations.

Shock

Rescue Remedy: 1-3 drops on the tongue, repeat as necessary, as often as every 10 minutes if needed.

Chamomile is a gentle sedative, can be administered orally as an infusion, or in homeopathic form

Spider Bite

Case Study

400 gram Brushtail Possum in care, was found lying on cage floor. Appeared to have had convulsions. Spreading paralysis, respiratory distress, eyes glazed. Animal was taken to vet and was diagnosed with a possible Redback Spider bite. Vet wanted to administer antibiotics. Carer brought the animal to me for treatment. When it arrived it appeared to be almost dead, hardly breathing.

Treatment

Homeopathic Ledum
Vit E with Selenium

Herbal Formula containing: Bupleurum, Astragalis, Schizandra, Andographis, Picorhrhizza, Withania

Seven drops administered, mixed with the ledum,Vit E, and Steevia powder to sweeten. Instructions to repeat dosage 3 times daily. I did not expect this possum to survive and was surprised when the carer phoned me that evening to report the animal was much improved. The next day the possum continued to improve, began to feed, but was still weak. Three days later, carer reported that her joey appeared to have made a full recovery. The rationale behind my treatment was to detoxify the body while supporting all the organs of elimination including the liver and kidneys.

Skin – Rehydration for Pinkies


© Linda Dennis (10)

Nemidon Ultra Hydration Gel.

This gel is derived from seaweed colloids and is hydrophilic.

Allows the skin to breathe while providing essential hydration of skin.

Spurs

Celery seed for spurs on birds feet, add to diet, also beneficial to kidneys.

Ticks


© Linda Dennis (11)

Apply one drop thyme oil directly on tick. Leave to drop off or use tick tweezers, which are available from vet clinics.

Use ledum 30c homeopathically, orally.

Case Study

A 20 month old male Eastern Grey, released but returned home most days, arrived home one morning appearing to be suffering from paralysis of the legs, also some respiratory distress and abnormally fast heart rate.

Treated with Homeopathic Ledum orally, and Vitamin E intramuscular injection. Kept cool and quiet. By late afternoon the joey was back on his feet and grazing. Next day appeared to be fully recovered.

Urinary Tract Infections

UTI's including cystitis, urethritis, dysuria, chronic inflammation of the mucous membranes of the urinary tract, urinary discharges.

Treatment

Corn silk tea. Can be combined with Couch grass, Nettle and Yarrow. Make an infusion, and use to make up milk formula. I make a herbal formula which has proven to be very successful in treating the above and is now used by many carers.

Case Study

Wallaby weighing 2.5kg. Veterinary tests revealed blood and protein in urine. Vet suggested antibiotic treatment. Carer sought my advice as she was reluctant to use antibiotics as this animal had a history of thrush infection.

My prescription

Reneel, A homeopathic treatment for kidney and bladder problems.

Herbal formula for cystitis.

Cranberry capsules.

Result

Within 24 hours of commencing treatment, joey was no longer straining, and urinating normally. Urine clear. Treatment continued for several days to ensure no recurrence of problem.

other useful remedies

Herbal Healing ointment can be used for cuts, grazes, and itchy skin conditions.

Stress: Bach flower essences

Fear: Mimulus

Grief: Sweet chestnut

If animal is insecure or jealous of another animal: Holly

If overly sensitive: Century

Bossy animals: Vine

Homeopathic

Beladonna for heat stroke and dehydration,

Rhus tox for spotty rashes, lameness that is worse just after rest but improves with moving for a while, sprains and strains

Sulphur for skin problems.

looking after the carer

Nutrients and Herbs That Help Keep Us Sane and Healthy

Stress increases Magnesium excretion necessitating increased supplementation during stressful periods. It is a natural tranquilizer, and is considered the "antistress" mineral.

Living in a hot climate such as here in Queensland we lose magnesium through increased sweating as well as a variety of other causes.

Taking a daily multivitamin supplement can be used as a preventative approach to maintain or improve health. If you have been deficient in the elements you are supplementing you will notice a big change in health or energy.

There is a wide variety of herbal preparations that are helpful in times of stress, including:

Chamomile, Passionflower, Skullcap, Valerian, Oats, Damiana, Hypericum and many others.
A balanced diet with plenty of fresh fruits and vegetables is the mainstay of good health.

glossary of terms

Infusion: An infusion is made in a very similar way to tea, using fresh or dried herbs. The water should be just off the boil, as vigorously boiling water disperses valuable volatile oils in the steam. Infusions can be made from a single herb or from a combination of herbs. It is best to make them fresh each day.

Decoction: A decoction is used for tough plant materials, such as bards, berries or roots. Decoction involves heating the plant material from cold water, bringing it to the boil and simmering for 20-40 minutes. Should be made fresh each day.

Before using any herbal plants it is vitally important that you can correctly identify the species. Some herbs can be dangerous if used incorrectly, and some can cause death.

version 2.1 updates

Topic	Page	Update
Longevity	28	New photo.
Ageing a Wombat	28	New photo.
Getting the Joey Settled	44	New photo.
Milk Formula	47	New photo.
Teats and Holes	52	New Supplier (Wild Baby Teats).
Wombat Joey Poo	61	New photo.
Inside a Wombat's Pouch	61	New title and new photo *Previous title: Inside a Joey's Pouch*
Natural Food and Supplements While in Care	71	Two new photos.
Infection Injection	79	New section.
Treatments for Minor Conditions	83	New medication listed (Panalog).

version 2.2 updates

Topic	Page	Update
Lavender Oil for mild mange	85	Instructions on mixing essential oil with a carrier oil.

version 3 updates

The Care Guide

Topic	Page	Update
Introduction	6	Change of contact details for Dr Anne Fowler.
Brief History	22	New photos showing subspecies of *Vombatus ursinus.*
Longevity	29	Updated section and new photo.
Rescue Kit	34	Updated section.
Stress Hollows and the Death Cross	67	New photo.
Mange	81	New photo.
Prolapse	82	New section and photo.
Stress Alopecia	84	New section and photo.
Ticks	85	New photos.
Treatments for Minor Conditions	86	New medications listed (Pain Stop, Infant Panadol and Nizoral).
The Fully Furred Joey	100	New photo.
Case Study – Babushka	127	New section.

Topic	Page	Update
Case Study – Buddha, a very complicated case	129	New section.
Case Study – Wombat Honey	133	New section.
Case Study – Rosie's Story	134	New section.

The Veterinary Guide

Topic	Page	Update
The complete Veterinary Guide	137	Now in alphabetical order.
Cystitis and Bladder Stones	143	Updated section.
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Toxoplasmosis (Anne Fowler)	151	New section.
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Topic	Page	Update
Diarrhoea and Digestive Upsets	159	Updated section and new photos.

version 3.1 updates

The Care Guide

Topic	Page	Update
Sub-cutaneous injection	43	Updated secion and new photo.

critter contacts

critter contacts