Western Ringtail Possum

Raising Babies

Fact Sheet 6

Hand-rearing should be guided by the natural situation.

If it is known that the baby has been thrown out of the pouch, there is most likely something wrong with it.

If you have more than one animal and they are not twins, preferably don't put them together. If possible, newcomers should be quarantined until you know that they are healthy.

Pouch babies are usually presented with hypothermia – slowly warming them to normal body temperature is the first priority. Don't feed until the baby has reached normal body temperature (slightly lower than ours).

After prolonged hypothermia and milk deprivation hypoglycaemia (low level of blood sugar) is likely. In that case a vet should give fluids containing glucose SC (subcutaneous) or IV (intravenous).

As a baby mammal the ringtail needs warmth, security and closeness to another mammal (us), however, it also needs rest and a quiet environment and should not be handled unnecessarily.

Fluffy baby possum (ca 150 gm)

Housing requirements

A box of 30 x 43 x 36 cm (carry cage size) is adequate; however most carry cages have too wide bars. If the head of the animal can fit through the whole animal will fit through.

The box should be lined with soft cosy material without any loose threads that can wind around tiny extremities.

The baby should be kept in an artificial pouch made from natural fibre with no seam edges inside (risk of catching nails or teeth in them or sucking and ingesting of loose fibres). If you use polar fleece for warmth it should be lined with soft cotton fabric.

Weaning from the pouch should be very gradual.

Encourage emergence for longer periods, however first forays are stressful. Always stay with the baby. Stuffed cotton toys for human newborns also make good company for possum babies.

As long as the pouch young would stay close to its mother in the wild heating (heat pad) is required. Weaning off has to be gradual.

Always use heat pads according to the manufacturer's advice. Space needs to be sufficient for the baby to move away from the heat source.

Keep baby's cage in a quiet area and cover it during the day.

Food

Marsupial milk composition changes profoundly quantitatively and qualitatively according to the changing needs of the baby.
Carbohydrate, protein and lipid concentration increase gradually until the young is ready to leave the pouch, and then decrease again. Increase in the energy content of the milk corresponds with the increasing energetic demands of the growing young.

Marsupial milk has very low levels of lactose, particularly in the early stages. Only after pouch emergence and the start of eating solids, carbohydrates change to more simple sugars (lactose). Milk formula must therefore also be low in lactose. The predominant carbohydrates (lactose or other sugars) are transported very slowly from the gut into the cells.
If lactose is high, not all sugars can be transported into the cells. Unabsorbed lactose accumulates within the gut and water is drawn into the gut causing diarrhoea, dehydration, mal-absorption of other nutrients, malnutrition and retarded growth. With any formula the slow absorption rate limits the rate at which artificial formula may be fed without causing diarrhoea. Mother-reared pouch young suckle constantly, drinking small volumes very frequently. If fed less frequently and too high volumes, sugar accumulated in the gut may cause diarrhoea.
It is important not to overfeed. Water should be offered between milk feeds.

3 main low lactose formulae – all using a different sugar in place of lactose
Wombaroo <0.8 (less than 80% of pouch life completed) / **Wombaroo >0.8**
Gos for immature pouch young / **Biolac 100**
Di-Vetelact

Natural milk changes its composition during the baby's stages of development. Wombaroo and Biolac (Gos) therefore provide 2 types of possum milk for immature pouch young and fluffy babies. The milk for emerged young is higher in fat and lower in protein. Feed 10-15% of body weight.

in %	Protein	Fat	Carbo-Hydrate
Wombaroo <0.8	5.5	2.5	6.0
Wombaroo >0.8	7.5	9.0	5.0
GOS	not published yet		
Biolac M100	5.0	5.0	5.0
Di-Vetelact(A)	3.0	4.0	5.0
Di-Vetelact(B)	4.8	6.0	7.6
Natural	7.0-8.0	2.0	4.0

Di-Vetelact is to be prepared in 2 dilutions (A and B). Start with dilution A then gradually increase to B. Feed 20% of body weight.
Di-Vetelact has significantly lower energy content than natural milk for the later stages of pouch life and post emergence. This deficiency is largely overcome by the larger daily volumes fed.
Its other deficiency is its high sugar content compared with natural milk. This might be negative for the establishment of a balanced gastrointestinal microflora required for digestion of leaves.

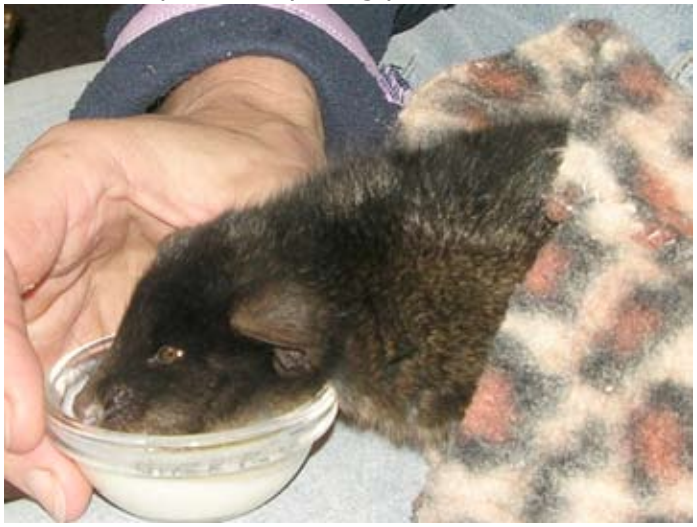
A significant difference between all formulae and natural milk is lower lipid (fat) concentration in natural milk.
However, so far there is no experimental evidence to justify the recommendation of one over another.

Babies coming into care are susceptible to diarrhoea when adjusting from mother's milk to formula. If necessary dilute formula and/or use an oral rehydration electrolyte solution for the first few days.
Hand-reared pouch young can lose 5-10% of their body weight when coming into care – this is still considered normal.

How to feed milk

Use boiled and cooled water. It should be fed at around body temperature (possible need to reheat in between). Never keep any left-over.
Establish a standardised feeding regime.
Immature pouch young: feeds need to be evenly spaced around the clock
Fluffy babies: start with 6 feeds spaced throughout the day.
Offer equal volumes each time.
All changes to the feeding regime should be made gradually.
Most fluffy babies will lap, however, it might be necessary to drip the first drops of milk into the mouth (eyedropper, syringe etc) and there are tiny teats available.

To feed wrap the baby snugly into its beanie or



a soft cloth so that only the head is out and put a shallow dish with milk next to baby's mouth – don't push the nose in! For difficult feeders cover the eyes as well.
Don't leave milk in the cage at night – overfeeding, milk becoming too cold or hygiene issues could cause problems.
The frequency of milk feeds is to be reduced very gradually until weaning is completed when the ringtails reaches a weight between 550 and 650 grams.
Young marsupials carry an enzyme that allows them to digest milk – they lose this as they grow into adults. Prolonged milk uptake could lead to a preference of milk over leaves.

Offer fresh young peppermint tips as soon as the baby is fluffy.

When starting to eat solids, they need appropriate bacteria in their gut. Fluffy possums should have received those bacteria from their mothers.
Apart from milk fluffy babies should be offered: Fresh young peppermint leaves, young foliage of other native trees, some native flowers (e.g. grevillea, bottlebrush)

Water should always be available.

The amount of fruit (if given at all) must be strictly limited (5-10 grams) otherwise it'll be the favoured and major dietary item soon. The high sugar content in fruit can lead to severe health problems including deadly bloat.

Toileting

Mother ringtail keeps her baby and pouch clean by frequently licking them to remove urine and faeces. Babies seem to be unable to empty their bladder and gut spontaneously.

After or before feeds baby therefore needs to be toileted. Stimulating its cloaca with warm moist cotton wool will make it urinate and defecate. Babies usually urinate at each feed but won't always defecate.

However, excessive stimulation can cause health problems (inflammation, dermatitis, fungal disease, prolapse of the cloaca, swelling).

Monitoring requirements

Weigh firstly daily, when steady growth is achieved at least once a week.

Observe urine and faeces output. It is quite common that babies come into care and defecate but stop soon after. They need to adjust to a captive diet.
Observe whether faecal consistency is normal – thick paste. Pooh is an important indicator of good or bad health!

Hygiene

Pouches and liners are to be changed at least daily - if soiled more often. They are best laundered with an anti-bacterial nappy wash solution.

Clean and disinfect the cage regularly.

Wash your hands with an antiseptic soap before milk preparation and feeding. Wash and rinse then sterilise feeding equipment.
Wash hands between animals.

Common problems

Many diseases in hand-reared possums are due to poor management and husbandry - poor hygiene, excessive handling, noise, and exposure to children or pets…

Stress is a common precipitant to illness. Stress can be caused by excessive handling, petting, kids playing with them, taking flash photography, contact with unfamiliar humans or animals, unfamiliar environments, noises or sudden changes in any routine – and this list is not even exhaustive.

Remember that mother-reared babies develop in a quiet, dark, secure and stable environment. They are only very gradually exposed to the outside world and to social contact with other possums.

As ringtails are prone to **imprinting** on humans, there is a fine balance between sufficient nurturing in order to provide a sense of security and closeness and treating a wild animal as a pet. Ringtails need to be gradually weaned off us humans when growing up.

First signs of illness or **failure to thrive** include: Poor appetite and feeding response, generalised muscle weakness, unkempt coat and depression.

Impatient feeding or dipping the baby's nose into the milk can lead to **aspiration pneumonia**.

Diarrhoea is a common and serious problem. Causes include: transition to formula, excessive daily milk volume, low frequency feeding of large volumes, irregular feeding routine, inadequate milk temperature, poor hygiene and stress.

Always correct hydration deficits by offering oral rehydration solution between milk feeds however continue milk feeds to avoid inadequate energy intake. Otherwise weight loss will compound the problems.

Hindgut fermenters are particularly susceptible to digestive problems after antibiotic treatments.

Common pathogens associated with diarrhoea:
E. coli - mostly in newly orphaned animals, acute liquid diarrhoea,
Salmonella spp - mostly affecting animals in long-term care, chronic pasty diarrhoea,
Klebsiella spp - long-term care, chronic liquid diarrhoea
Young possums are particularly susceptible to Salmonellosis, however it seems not to be a major cause of disease in free living possums. As there is a risk of transmission to humans particular care should be taken if ringtails have diarrhoea – a faecal culture should be considered if Salmonellosis is suspected.

Orphaned and hand-raised ringtails are more susceptible to infections – stress-free, clean environments are the best prevention.

Bacterial and yeast infections can follow diarrhoea.
Yeast including Candida spp is most common following antibiotic treatment.
Signs include: affected area reddened, grey-white plague-like or ulcerative lesions, diarrhoea, yeast smell.
Nystatin is sometimes given prophylactically after antibiotic treatments.

Bloat (abdominal distension) can occur at any age, but is especially common around weaning time and in sub-adults. Most likely causes: high carbohydrate, fruit-based diets, and/or antibiotic treatment (disturbance of gut flora).
After all antibiotic treatments, give a Probiotic (Protexin) at least for the same length of time as the antibiotic was given.

Caecal stasis and associated bloat are often seen in possums that were weaned onto inappropriate diets with high fruit content. A ringtail's diet has to consist primarily of leaves when weaning in order to establish normal caecal function.

The already very large caecum (relative to body size) becomes distended with fluids in bloated animals. The tummy is spongy to touch; faecal volume is low with small pellets and the animal suffers from acute abdominal pain, increased thirst and restlessness.

Immature pouch babies (below 100 gm)

Babies should at least have a fine velvety covering of hair on their back, eyes should be open and ears erect.

Ringtails below 60 grams might not have received sufficient immunoglobulins and gut bacteria from their mothers and are highly susceptible to infection and severe digestive problems. 24-hour care (2-hourly feeds around the clock) will also put extreme pressure on the carer.

Immature babies should be checked for palatal and lip injuries if they were pulled off the teat (or if it's unknown), as this can cause trauma to the oral cavity.

Always check carefully for any wounds: cat bites, bird pecks, ant bites and maggots.

Housing requirements

The moist humid environment in the pouch prevents drying of the skin and dehydration. The skin of unfurred pouch babies is highly susceptible to drying and cracking which can lead to bacterial infection.

Unfurred skin dries out very quickly - keep it well-hydrated using moisturisers such as pure sorboline or lanoline oil. Apply the oil frequently as a thin film over the entire body.

Furless ringtails need a constant temperature of 34 to 35 degree Celsius, when fur develops 32 degrees and when fully furred 28 degrees. Humidity should be kept at ca 70% for furless and just furred ringtails. A humidicrib or brooder is highly recommended.
Immature babies are at constant risk of hypothermia and hyperthermia. They should therefore be removed from their stable environment as little as possible. What ever possible do in the heated unit.

Keep spare pouches etc in the heated unit to prevent heat loss when you change linen.

Food

Wombaroo>0.8 and Biolac Gos are particularly made for immature pouch young.

Commercial bovine colostrum products may be advantageous as a substitute for the maternal immunoglobulins transferred in milk throughout much of pouch life.
Collostrum (e.g. Wombaroo Impact) is a milk-like substance that jump-starts the immune system. It's high in carbohydrates, protein, immunoglobulins and antibacterials but low in fat. Nutrients are delivered in a very concentrated low-volume form. It also has a mildly laxative effect. However, it also seems quite high in lactose.

Probiotic products (e.g. Protexin) or day faeces of a healthy possum help introduce healthy gut flora if this process has not yet been achieved by the mother. There is no scientific evidence which method is superior.

Feeding

Even the tiniest pouch baby might lap, however this is not recommended as it is very strenuous. Use a syringe with a short tube (butterfly catheter). Milk should be carefully drizzled into baby's mouth.

At a later stage, tiny teats in (ringtail) nipple shape and size are important in avoiding deformation of the poorly calcified bone of the jaws. The hole needs to be big or small enough so that milk drips out slowly.

Always feed the baby in the pouch with only the head protruding. Cover their eyes and make sure that the milk flow is not quicker than the ringtail can swallow. If it should be sucking frantically, feeding frequency has to be increased.

After (or before) food a gentle stimulation of defecation and urination is required, however don't overstimulate the sensitive cloacal mucus membranes.