

### Background questions:

1. Where did the animal come from? - Habitat
2. What would be its situation in the wild? - Natural living conditions
3. Why did it end up in care? - Threats

### 1. Habitat

Formerly a resident of a wide range of forests and woodlands in the South West there are now only three major populations left:

Coastal strip Busselton – Dunsborough (including town sites)  
Ringtails are heavily dependent on peppermint trees  
They build dreys for daytime shelter

Ludlow Tuart Forest  
Ringtails are depending heavily on peppermint trees but live mainly in tree hollows

Upper Warren region  
Ringtails are mainly living on eucalyptus varieties and sheltering in tree hollows

Keep records:  
Contact details of the people who found the animal or passed it over to you (in case there are questions later on)  
Location where it was found (possible future release site)  
If it was someone's backyard always ask whether the animal can return after rehabilitation

### 2. Natural living conditions

Ringtails have adapted to a life in our suburban backyards.  
In Busselton and surrounds they can potentially be found where ever there are peppermint trees.  
Ringtails are crepuscular (main period of activity: dawn and dusk). They feed and socialise at night, however, on hot summer days they sometimes can be seen during the day.

#### Rest sites

Busselton ringtails sleep in dreys made of leaves and twigs, rest in tree forks, use roof cavities or even nest on the ground if there is dense understorey. Abandoned rabbit warrens, grass tree or palm tree skirts also serve as occasional day shelters.  
Ringtails usually have several dreys but only mums and babies share dreys.



#### Dispersal to the nearest available habitat:

Boys: 7 to 8 months of age (including around 100 days in the pouch) weighing over 700 grams

Girls: 10 to 12 months of age (weighing in excess of 800 grams)

Some stay with their mums until the next baby leaves the pouch.

**The social structure** of Western Ringtails differs from that of Common Ringtails. They are far more solitary with less sociable habits and less pouch babies.

Ringtails are territorial and the most peaceful combinations are mothers with daughters, even with mature daughters.

Adult males, adult females and males and mature females have been seen fighting each other for habitat, food or a chance for reproduction.

Sub-adult males sometimes get sent off by their mothers in quite an aggressive fashion and even twins don't always tolerate each other's presence.

Most births occur from April to July with a second peak from September to November.

### 3. Threats

Most frequent reasons for receiving a ringtail into care:

- Clearing of habitat – ringtails become homeless or injured in the process
- Traffic – they often sustain severe injuries, sometimes internal
- Attack by a cat – even small wounds lead to death if left untreated
- Attack by a dog – resulting frequently in a fractured spine (hind leg paralysis)
- Attack on mother ringtail - orphaned baby
- Powerlines, fire, barbecues - burns
- Poisoning by rat and snail bait
- Disease

### Records:

**If you know what happened, write it down!**

## Biological background information:

### Marsupials

Most clearly distinguished from eutherian mammals by:

- immaturity of their young at birth
- a pouch to complete embryonic development

The cloaca is used for reproduction and excretion of waste products.

Females:

2 lateral vaginae and a median vagina with a temporary central canal through which the young is born.

Males:

The penis is hidden in the cloaca. Testicles 'drop' around weaning time and are relatively big for the body size.

### Reproduction & development

Gestation is very short (14-16 days in Common Ringtails)

The neonate (ca 15mm long) climbs from the cloaca towards and into the pouch and attaches itself to a teat. It is possibly aided by a saliva trail provided by the mother as guidance.

Head, shoulders and fore limbs are relatively well developed and strong.

Eyes are closed; lips are fused laterally with only a small opening – allowing permanent attachment to a teat and continuous suckling of the dilute early-stage milk.

The neonate is hairless and its thyroid function is undeveloped – therefore relying on a stable temperature in the pouch.

After birth the pouch young is completely immunodeficient and almost entirely dependent on passively acquired maternal antibodies for its immunological protection.

Ringtail mothers keep their offspring and the pouch clean by frequently licking them to remove urine and faeces. This might also help in the immune protection for the baby against potential pathogens in its immediate environment. Ingestion of microorganisms from the pouch and faeces by the mother trigger the production of maternal antibodies that will be transferred to the young in the immunoglobulins of the milk.

Only half-way through pouch life the young will have acquired some immunity through its own active responses.

Highly immature pouch young that come into care must be considered as at risk from infectious disease because they are no longer receiving passive immunity. They will have lost most maternal immunoglobulins after about 4 weeks of separation from the mother. Their own underdeveloped immune system cannot yet provide sufficient protection.

The pouch in ringtails is permanent, deep and forward-opening and has 4 teats. Normal litter size in marsupials is less than the number of teats and Western ringtails very rarely have more than two babies. Approximately 10 to 17% of births are twin births.

The pouch can be closed and opened by contraction or relaxation of mother's underlying muscles. The teat in use gradually elongates as the pouch young grows, and returns gradually to its normal size after weaning. The pouch also expands with the growing young.

After releasing the permanent grip on a teat, the pouch young stays in the pouch until its eyes are open, it is well-furred and able to regulate its body temperature.

Pouch young leave the pouch permanently after ca 100 days and at a weight of around 130 grams.

### Digestive system

Herbivores can be classified by their principal site of microbial fermentation – hindgut or foregut (kangaroos) fermenters and more specifically colon (wombats) or caecum fermenters.

Marsupial arboreal folivores such as ringtails are (hindgut) caecum fermenters. This means that most digestion takes place in a greatly enlarged caecum.



Leaves are a poor food source and hard to digest. As added obstacles ringtails have a low gut volume (e.g. compared to cows) and need enough nutrition for an active arboreal lifestyle.

In order to make leaves digestible, microbes that synthesise protein and B-vitamins and specialist bacteria in the caecum are required - without those ringtails cannot live on a diet of predominantly leaves.

The transition from digestion of simple milk sugars (babies) to fermentative digestion of complex plant carbohydrates relies on the establishment of a suitable microbial gut flora.

The fermentation process is time consuming so that the caecum needs to be very large.

Finely grinded leaves together with saliva containing enzymes go into the stomach and the breakdown process starts.

From there it all goes into the small intestines. Carbohydrates, proteins and fats would now be digested (e.g. milk) but plant fibres are tough. The pulp goes on into the caecum and the bacteria do their job before the digested matter passes into the large intestine and is finally excreted from the cloaca.

However those pellets are still high in protein and too nutritious to be wasted.

Ringtails therefore recycle those fresh, moist, soft, greenish caecal pellets by re-ingesting them and sending them through the process again. After the second digestion the excreted pellets are hard, dark in colour and containing all the waste materials. Those faecal pellets are what we find in our gardens.

In order to make this recycling possible a special separation mechanism is required. When the ringtail is active it is 'switched on'. All the freshly chewed leaves go into the caecum for storage, while the old already recycled matter is excreted. That's when we see them eating and poohing simultaneously.

When the ringtail is sleeping - curled forward with its mouth over the cloaca - this separation mechanism is 'switched off' and the contents of the caecum are released for immediate reuse. This way the most efficient absorption of nutrients is ensured and a maximum benefit received from the food without having to invest the energy into a new search for more.

The technical term for this is coprophagic - eating its own pellets - or caecotrophic - eating material derived from the caecum.

The gastrointestinal tracts of pouch young require the introduction of these appropriate bacteria and protozoa to facilitate fermentation. The mother possum therefore feeds caecal pellets to a baby. This 'pap' microbially resembles the contents of her caecum. Faecal pellets (waste product) cannot be used.

