

Bandicoots as companions

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ABSTRACT

Bandicoot marsupials appear to have many of the characteristics desired by people seeking companion animals. They could be made available to the public for keeping as pets in a way that would be of some benefit to nature conservation and to our sense of cultural identity. A properly designed study is needed to explore the appropriateness of keeping bandicoots in Australian households as pets.

Introduction

In Australia-New Guinea, indigenous peoples have kept pets including marsupials. Bulmer (1968) includes the statement: "In addition to the semi-domestication of feral pig and cassowary already mentioned, spotted cuscus *Phalanger maculatus* and occasionally other cuscuses and ringtail possums are sometimes kept as pets until such time as they are eaten".

Peter Dwyer's (University of Melbourne, pers. comm. 2000) observations include quite a few instances in a number of different places/societies of hornbills being kept as pets in New Guinea. As a zoological anthropologist intermittently working in many parts of PNG over the last thirty years, he recalls one case of a flying fox *Pteropus* sp. kept as a pet by a Kubo woman. Among Febi people, in mountains immediately to the north of Kubo, a healthy young tree kangaroo *Dendrolagus* sp. was kept as a pet. He suspects that most of these instances are, as Bulmer suggested, initiated with the intention of rearing the animal for subsequent consumption or sale but, in a few cases, the attachment grows to a point where the owner no longer contemplates disposal of the animal.

Noske (1997) writes, "The Australian Aboriginals are known to keep pets, or at least to include in their domestic sphere a wide variety of animals: wallabies, possums, emus, mice, rats, young birds and dingoes". She then directs attention to a brief footnote: "This, however, is usually a temporary matter; when the adult animals have been killed the young are often given to the children to play with".

Certainly, among the Kubo, it qualifies more as 'torture' than 'petting'. The young animals are, within a short period, 'loved to death' by the small children and are then cooked and eaten. It is more delayed consumption, rather than pet-keeping in the Kubo case (P. Dwyer, pers. comm. 2000).

For Australian Aborigines, dingoes *Canis dingo*, and more recently dogs *Canis domesticus*, have a central place in the lives of many people (Hamilton 1972). Considerable numbers were kept. Young dingoes were kept as pets and then wandered off or were occasionally eaten when they became adults. Dogs, as distinct from dingoes, were often used for hunting and tended to remain as companions for life. However, with passing time, hybridisation has increasingly blurred this distinction between dogs and dingoes, particularly in southern Australia. The relationship between Aborigines and dogs was a little different from that of dogs in contemporary society in that they were struck when they competed too directly for food or warmth around a fire.

Deborah Bird Rose (Australian National University, pers. comm. 2000) tells of animals which are encouraged to sit on people, especially children, and may shelter in the hair, such as sugar gliders *Petaurus breviceps* on Tiwi islands and Thorny Devil lizards *Moloch horridus* in central Australia. Such arrangements would be suitable for mobile people who move about the landscape a lot and have companion dogs around them on the ground.

So the use of pets by indigenous Australian and New Guinean people is of limited value in identifying suitable pets for much of contemporary Australia. Alternatively, there is a range of characteristics of companion animals which make them attractive to people. Not all species kept as companions or pets (used interchangeably) have all these characteristics or in the same proportions. People choose pets according to their needs, their circumstances and their personalities (see Serpell (1996) for a comprehensive discussion).

I examine the potential of that Australian-PNG marsupial group commonly known as bandicoots, as pets as an example. No species of animal is likely to provide the definitive answer to all people's pet needs.

How do bandicoots measure up?

Cuteness

Konrad Lorenz (1954) argued that the cute response is elicited by large heads, short chubby limbs, big eyes, small jaws, mouths and noses, fatter rounder appearance, soft skin, fur or feathers and clumsier less co-ordinated movements. Lorenz was probably over-influenced by dogs, but he does have a point. Bandicoots are smallish, between the size of a cat and a guinea pig, generally 200-2000 g but can go to 3000 g in captivity. They have long noses and short limbs. They are tolerant of stroking but the fur is relatively coarse to touch. The cuteness rating for bandicoots is thus only moderate.

Tractable behaviour

Bandicoots are confiding. They come in about camps in the bush, hovering around the edge of the light of the campfire. They lick dirty plates after lazy campers have gone to bed. They can be coaxed to take food from the hand.

After being repeatedly caught in live mammal traps they readily tame to being handled, particularly females. The first time they are trapped they thrash about a lot, more so than most smaller mammals in the same circumstances. They are less frantic the second time, and so on with successive trappings. After a few times they become very tame indeed. They allow a trapper to pick them up without struggling. Females permit a trapper to part their rear legs and examine their rear-oriented pouch and reproductive parts in a very relaxed manner.

Isoodon macrourus exhibits a relatively low level of response to novel objects (Russell and Pearce 1971), but females were more active than males in open field behaviour tests (Day *et al.* 1974).

They are not particularly social by nature. The basis of a human's relationship is likely to be one of coming to someone for food rather than companionship, as is the case with some breeds of dogs.

Ease of feeding

The diet is opportunistic and omnivorous, with an apparent preference for invertebrates (see Gordon and Hulbert 1989). They eat a wide variety of food available in a household including pet food and domestic scraps of wide variety. Gordon and Hulbert (1989) suggest that foods such as the various solid pellets for laboratory animals and dry dog food are suitable staples, though supplements are advisable, preferably including insects. *I. macrourus* kept solely on rat pellets may show a lightening of the coat colour, indicating some nutritional deficiency. Lyne (1982) recommended about a 100-200 gm diet of mince, snails, eggs and mealworms for both *Perameles* and *Isoodon*. Williams (1990) recommended a daily diet per animal of : a small handful of dried dog kibble, 30 g of *Wombaroo* small carnivore mix (*Wombaroo* Food Products, PO Box 151, Glen Osmond SA 5064), 6-10 small pieces of apple, 1 small-medium banana, 4-6 pieces of tropical fruit and melons when available, and a quarter slice of bread. Insects were given when available and mice were sometimes use as a substitute for the small carnivore mix. *I. macrourus* will drink water when it is available but will maintain water balance without access to free water (Hulbert and Gordon 1972). Clearly there is a wide dietary tolerance and room for a fair range of substitution.

Attractive habits

Not being carnivores, their faecal material is less offensive than that of dogs and cats. It is not known how amenable they are to toilet training. In most species, the front foot is well equipped for digging, with a rudimentary first digit, a second and third which are large and strongly clawed, a fourth short but clawed, and the fifth much reduced and having no claw. They do not usually bite, using their hind legs for fighting other bandicoots. For most species, on the hind foot, their first digit is rudimentary, the second and third are syndactylous (joined together for most of their length), the fourth is very large and carries a long

nail, the fifth though smaller is also armed with a strong nail. They also use their syndactylous toe with great dexterity for grooming.

The can be extremely active, jumping to nearly 2 metres when chased in captivity (Gordon and Hulbert 1989). Although typically nocturnal, there can be some diurnal activity in the wild (Braithwaite 1977, Lobert and Lee 1990). However, activity patterns in captive animals can be influenced by timing of feeding, and bandicoots would be amenable to such influences.

Life span

In captivity they normally live for about 3 years. For many people this duration fills a convenient duration of need for companionship by a child, an elderly person or those with a prolonged illness.

Vulnerability

While they are very tough, often encountered with large scars resulting from close encounters with predators, they are vulnerable to being eaten by dogs and cats and run over by cars. This is probably no more so, however, than with guinea pigs.

All bandicoots examined are competent homeotherms in the cold. They are capable of raising their metabolism up to four-fold by shivering, in order to maintain a constant body temperature of 34-36°C. In the heat, they survive by panting and licking saliva on their body surface (Gordon and Hulbert 1989).

Breeding

They readily breed in captivity and produce prolifically if the food resources are available. Normally males are brought together with the females for brief periods of mating and then housed separately again. Mating occurs at night and consists of a period of following by the males, brief mounting and copulation. This is followed by a waning of attraction (Stodart 1966). While females have eight nipples, generally between 1-4 young are carried in the pouch. Often a litter of 3-4 at birth will gradually reduce to one or two by the time of weaning at around 60 days. The number raised seems likely to be adjusted to what they can nurture with the quantity and quality of the diet available to them. Females have been seen evicting the smallest of its young. As with pouch young of marsupials generally, mature pouch young hop in and out of the pouch and increasingly forage with their mother. However, there is no lasting attachment between mother

and young with the period of "young at heel" either brief or non-existent. It remains to be seen whether breeding would be a good idea in a pet situation.

Housing

Various suggestions for housing bandicoots are to be found in the literature.

Gordon and Hulbert (1989) suggest that 25 m² is needed to house a pair together. Stodart (1966) used enclosures of 500 and 1000 m² for breeding *Perameles nasuta* which is more difficult than *Isoodon*. Grass and other vegetation allow the construction of bandicoot nests in enclosures and some foraging by digging (Lyne 1982). Collins (1973), White (1997) and Williams (1990) all make suggestions on housing bandicoots. The latter author suggests housing design particularly to avoid predators. Specifically, he suggests wire-netting fences 180cm high, with a 60cm flat, galvanised steel strip near the top of the fence and wire-netting at the bottom buried 30cm deep in the soil. As with some other pets, it remains a matter of judgement as to the extent that the animals are allowed to run free in a house or back yard, or are kept in cages or enclosures for at least part of the day.

Diseases

Williams (1990) reports that Taronga Zoo has found toxoplasmosis to be reasonably common in bandicoots. The protozoan *Giardia*, necrobacillosis, salmonellosis, mycotic encephalitis and non-lethal lungworms were also found in pathology files. Of 9 deaths of *P. gunnii*, 3 were from pulmonary infections, 3 from stress and 3 from snake bite (Seebeck 1979). It is unclear if the risk of human infection is any higher than with dogs and cats as pets.

Environmental responsibility

Seebeck *et al.* (1990) list 10 Australian-New Guinean species of the Family Peramelidae, and 10 New Guinean and one Australian species of the Family Peroryctidae. Australian peramelids have the worst extinction record of the Australian mammals which is regarded as the worst in the world. All species of the semi-arid and arid zone have become extinct or been reduced to a few remnant populations (Morton and Baynes 1985). The species of mesic Australia have also undergone substantial declines in distribution and abundance (see Seebeck *et al.* 1990). Of 11 Australian bandicoots and bilbies, 3 are regarded as extinct, 2 as endangered, and 4 as vulnerable (Kennedy 1992). Thus an effective

breeding program in captivity could both maintain a larger species population with pets and also be designed to produce a surplus which may be rehabilitated into the wild thereby improving its conservation status.

Cultural appropriateness

Miserable as an orphaned bandicoot on a burnt ridge, bald as a bandicoot, poor as a bandicoot, there isn't a bite for a bandicoot, bandicooting, bandicoot gunyah, blind as a bandicoot, boudoir bandicoot, barmy as a bandicoot, lousy as a bandicoot, land so poor that a bandicoot would starve on it; are all colloquialisms of a less urban society of nineteenth and early twentieth century Australia (Balmford 1993). Early Australians appeared to see bandicoots as animals living very close to the edge of existence, animals living a life of opportunism and hardship. They were typical Aussie battlers, hard working, often down on their luck, cheeky but somehow charming. There is some suggestion the reputation was passed from Aboriginal people. "When hungry, cold or unhappy, the Australian black says that he is as miserable as a bandicoot" (Balfour 1845 in The Australian National Dictionary).

Australian prisoners of war in the Pacific War revived the use of the term "bandicooting" for "digging under a vegetable, removing its root and leaving the leaves, undisturbed on the surface, to wither a few hours later" (Beaumont 1988). This became a highly developed art amongst the other ranks who apparently approved of bandicooting the officers' gardens while condemning theft among themselves.

Scientific background

There have been a considerable number of studies on bandicoots, both in the wild and in the laboratory. Hence there is much background information of interest to potential owners.

Although the family is distributed across all major biomes of its Australia-New Guinea distribution, it is the species *Isoodon macrourus*, *Isoodon obesulus* and *Perameles nasuta* that have been the focus of the majority of scientific research.

There are excellent summaries of the substantial literature on bandicoots in Gordon and Hulbert (1989) and Seebeck *et al* (1990). Below only a couple of highlights are selected.

Of the marsupials, it is the Family Peramelidae (bandicoots and bilbies) that appears to have reproductive a strategy most similar to that of small eutherian mammals (Braithwaite and Lee

1979). Peramelids have the shortest gestation period of any known mammal (12-13 days; Lyne 1974), followed by a short period of lactation that may last up to 60 days (Gordon 1974; Friend 1990) and young may reach sexual maturity within three months (Gordon 1971). This rapid development may be a consequence of the group having the advanced chorio-allantoic placenta (Padykula and Taylor 1977). Accompanying this accelerated ontogeny, there is little variation among different genera and species in life history variables (e.g. litter size, body size, food habits, rate of growth) (Lee and Cockburn 1985; Cockburn 1990). It has been suggested that these reproductive traits have led to morphological conservatism within this family, and an extreme behavioural plasticity to changing environmental conditions (Lee and Cockburn 1985; Cockburn 1990). It is has been assumed that the considerable variation in the timing of reproduction varies geographically (spatially) because resources, such as rainfall and food, vary on continental scale.

What needs to happen?

For a scientist, it is not good enough to say, "I once had a bandicoot and it was a charming pet". We need to explore the problems and ways of caring for bandicoots as pets in a proper manner. Oakwood and Hopwood (1999) recently conducted a survey of people's experience with keeping quolls. This sort of study is useful but we need to go further. Without a lot more information, it is difficult to see anything being set in place to accommodate a wider use of marsupials as pets. A State Government wildlife authority would be well placed to set up a proper study whereby a number of people are provided with bandicoots and their experiences recorded and analysed. Such government agencies would need to grant permission and want to closely monitor, a politically sensitive project like this and which could also strongly influence their policy. In the experiment volunteers would be called from the public in a particular locality and be selected to participate in a bandicoot study course.

The bandicoot course would provide information on bandicoots. The course would provide what is known by experts at this stage. It would be used to build the right attitude to the experiment. Unsuitable people would also be weeded out during this process. People would need to be prepared to record their experiences on paper

and spend some time with the animals themselves and not just leave the animals to the children. After graduation from a short course of two-three nights, a bandicoot would be provided to people who had built a suitable enclosure.

A charge of \$100 for participation might be levied to defray costs. This might be around what people would be willing to pay but is unlikely to cover the costs, at least initially.

In the fullness of time commercial breeding facilities for bandicoots would become commercially viable if the numbers of people were sufficient. As discussed earlier, bandicoots certainly breed frequently, develop rapidly and could be fed cheaply.

People would be provided with written advice on what to do and a series of questions for them to consider during their time with the bandicoot. The questions of interest might include:

- What recommendations would you make regarding the husbandry instructions provided ?
- What advice would you give regarding the development of a relationship with a bandicoot ?
- What were the main problems with keeping a bandicoot ?
- How do bandicoots rate relative to other pets you have kept ?

Regular specific information might be required concerning type and amount of food eaten daily,

and the results of a weekly check of the animal's health (body weight, parasite load, reproductive condition). This information could be sent to the researcher on a weekly basis by email or the post.

Additional dimensions to the study might be:

- Some families be provided with pairs of bandicoots to determine if more than one could be kept as a reproducing pair.
- An experimental supply (breeding) system that would put bandicoots into pet shops be developed.
- Different species could be compared for suitability.

Concluding remarks

When the research advocated above is done, it may turn out that bandicoots (or other marsupials) are not very suitable as pets. Such is the nature of research. You do not usually know the answer and that is the point of doing the research. However, developing appropriate qualitative and quantitative research approaches using replicated experiments and communication of results is likely to lead to the most satisfactory companion relationships which care for the animal and deliver satisfaction to the carer. Ultimately successful programs should be another weapon in the armory in the war against extinction.

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