

TACHYGLOSSUS: SURVIVAL STRATEGIES FOR SUCCESSFUL RESCUE AND HAND REARING

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Summary

Monotremes, the egg laying mammals, are the oldest surviving group of mammals in the world. Of the three extant species, platypus, long-beaked echidna and short-beaked echidna, the short-beaked echidna, *Tachyglossus* is the one most encountered in rescue and hand rearing situations. Because echidnas are one of the earliest mammals, they are different in many ways. Acknowledging and understanding their survival strategies and differences are vital for the well being and welfare of the animal during rescues, care and hand rearing.

The goal of rescue and rehabilitation of an animal from the wild is to return it to the wild.

Background

Why is the echidna so different from most of the other Australian mammals? It was once believed that monotremes and marsupials evolved about the same time. Fossil finds and advanced genetic and biochemical analysis lead to the current realisation that monotremes are a much older group of mammals (~120 million years) than the marsupials. The primal monotreme blueprint incorporated sufficient broad tolerances to accommodate environmental changes

over the millenniums and ensure species survival. Later other models that included marsupials and placentals evolved more specialised.

A common general thought:

Evolution ~~P~~rogress → Better/Advanced Species

but we should also consider:

Evolution ~~S~~pecialisation → Niche Species.

The short-beaked echidna, our oldest surviving Australian mammal is also considered Australia's most common native mammal. Not because of numbers, at least in our world today they are not so plentiful, but because it is the only native mammal found in every environment, every ecosystem and every habitat type in Australia. The ancient monotreme paradigm is quite different from that of more modern species.

As a scientist interested in gathering facts and understanding what I see, one of my greatest challenges was shifting my learned paradigms to that of the echidna. It was necessary to change my way of thinking to understand what was happening, not what I thought was happening. Use of microchips provide positive identification of individuals and allows construction of life histories. All information presented here has been gleaned from living and working in the field with echidnas over the past 25 years. As well as the wild population, I have monitored the long term fate of rescued/rehabilitated animals and hand reared puggles.

When considering necessary elements of rescue, care and hand rearing, the needs of marsupials (i.e. temperature, food, social well being) are more closely related to those of placental mammals, than they are to monotremes. This is where the shift in caring paradigm

comes in. This is the time for every rescuer and carer dealing with echidnas to change gears, rethink animal welfare, step out of the box and into the realities of the echidna's universe. Echidna, THE different mammal.

Three fundamental elements in the rescue and care of all native mammals are

1) Temperature:

- a) what is the normal body temperature
- b) how do they cope with heat/cold (sweat, pant, lick/shiver, reduce surface area)
- c) are there different considerations for young and adult animals
- d) what type of housing best suits the temperature needs

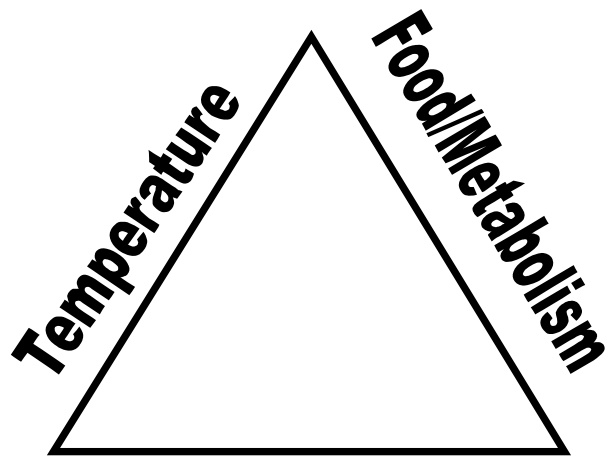
2) Metabolism/Food:

- a) fast or slow to metabolise
- b) what to feed
- c) how much/how often

3) Life style/Social Structure:

- a) solitary living or social (this will affect housing, handling and release)

These elements can be thought of as the Survival Triangle. All are equally important for health and well being, for the survival of the animal in care and its further life in a natural wild situation. All are interrelated. This means that all sides affect each other. It is the synergy of all that that enables healthy survival.



Survival

Social Structure

Survival Triangle: Essential elements for health and well being of rescued or hand reared wildlife.

Discussion

1) Temperature

Appropriate temperature can mean life or death to a rescued or hand reared animal.

Some important facts to remember about echidnas and temperature:

- a. Maximum active core body temperature range of an adult echidna is 31-33°C. This is the lowest of all mammals.
- b. Echidnas do not sweat, pant or lick themselves to keep cool. They avoid the heat.
 - During and after a rescue, keep an echidna in a cool place out of the sun
 - Never place an adult or puggle on a hot water bottle or heating pad
- c. The pseudo pouch of a healthy female carrying a puggle is always less than 30°C. She actively lets her body temperature and thus her pouch temperature drop during her inactive time of day.
 - When hand rearing a pouch young puggle it is best for its health and well being to be housed at a variable daily temperature between ~20 - 28°C (Rismiller 2008).
- d. Housing for both rescued adults and puggles should be cool, quite and in low or natural light.
 - If a rescued adult is not visibly injured, put in a cool, quite place in dark or low light. Do not disturb for 12 to 48hrs unless the echidna becomes responsive before that time (i.e. starts digging around or trying to escape)

Fact

Once a puggle has reached 45 to 50 days of age, the female places the young in a special dug nursery burrow where it remains until it is weaned at about 210 days of age. The temperature in the nursery burrow may fluctuate slightly, but it remains between 15 - 21°C even when outside ground temperatures may reach 65°C.

- When housing a puggle older than 50 days create as natural as possible nursery, i.e. use soil and litter and keep the temperature under 21°C. One tip for achieving this on very hot days is to put ice blocks or other cooling elements under the nursery burrow container.

Echidnas and Torpor:

Echidnas are capable of using **torpor** at any season and at anytime of the day or night. When in torpor an animal lowers heart rate, breathing, metabolism and body temperature. Torpor can be used as an energy saving mechanism, i.e. when it is hot or when food sources are not available. Torpor can also be a response to stress and/or stressful situations such as being rolled by a car or picked up by a carer after being rescued from a barking dog. Typically a torpid echidna is cool to the touch, sluggish, slow and not responsive. Healthy torpid echidnas have been monitored with a deep core body temperature of 13°C (Rismiller 1999). Never place a torpid echidna on a hot water bottle or heating pad.

2) Metabolism and Food

- a. Having a lower and variable body temperature also means echidnas have a slower metabolism.
- Both adults and unweaned young can go for a long time without food.
 - Active foraging adults may defecate only once every 2-3 days.
 - Lowering of body temperature and metabolism saves energy and is beneficial to healthy echidnas as well as those recovering from injuries

What, how much and how often varies greatly when caring for an adult echidna or hand rearing a young. Some important facts:

- While a young is being suckled by its mother (approximately 210 days) it is surviving only on mother's milk, it is not eating any solid food.
- After being weaned, echidnas feed on all types of ground and vegetation dwelling invertebrates (Rismiller 1999). Their diet will change seasonally with the life cycles of the invertebrates.

b. What to feed:

- There are a number of companies that make milk replacers. If your puggle refuses to suckle, change formulas.

"If it is accepted that the composition of the milk of a species is optimal for its young, then it is evident that the composition of all milk replacers can be improved. Because all have been used with some success, there are no compelling reasons that would justify using one product to the exclusion of the other". From the 1992 book URBAN WILDLIFE article: Milk substitutes for marsupials: In theory how good (or bad) are they? M. Messer & D. Walker.

- The amount of protein and fat in an echidna low lactose formula is most important. Best results have been when protein content is 24 - 26% and fat content is 29 - 31%. Different companies will add differing amounts of vitamins and trace elements
- There are numerous diets for adult echidnas being held in care or captivity. Most have improved with time and experience. Consult a local zoo or wildlife park (that has echidnas) about echidna diets. You will only need this information if an adult animal needs to be kept in care for longer than 7 days (Rismiller 2008).

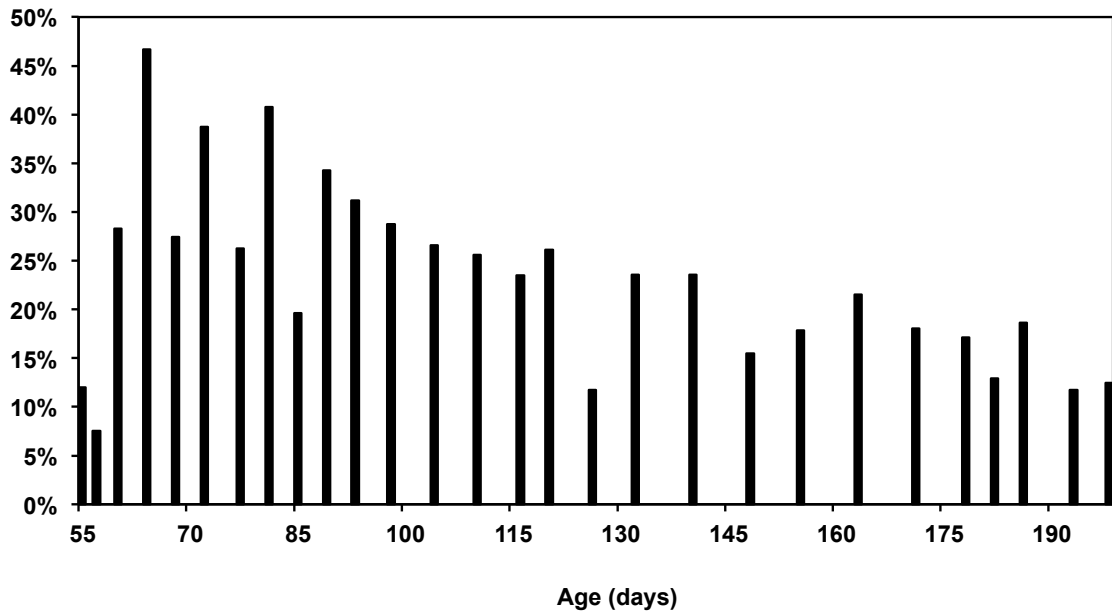
c. How much/ How often?

- When hand rearing a 50 day+ puggle, use a natural feeding regime. In the wild a female suckles her young for about 2 hours every 5 days. The amount of milk taken in varies between 10 to 40% of the young's body mass. See charts below.
- Adult echidnas being held in care may not eat for days or even weeks. This is not necessarily detrimental to the animal. Water should be available at all times. If the echidna does accept food, it can be offered a small amount daily.



Chart showing intake of milk (grey columns) and growth (dark columns under line) of a hand reared young from age 50 days to weaning at 204 days. This young was kept in a 'natural' burrow of soil and litter and fed on a 3 to 5 day schedule (Rismiller 2008).

VOLUME OF FOOD INTAKE EXPRESSED AS PERCENT BODY MASS



Amount of milk ingested by a young varies each time it suckles. This can be measured by weighing the young before and after each feeding session. Weight increase is then expressed as % of pre-feeding body weight. Burrow young echidnas generally take in between 15 and 25% of their own body weight each time they suckle (on a 4 to 6 day schedule). During early burrow growth, young may ingest up to 40% of their body weight (chart from Rismiller 2008).

3) Social Structure/Life Style

- a. Echidnas are very independent and non social animals. In the wild an echidna is solitary living except during the breeding season. There is no parental care or 'teaching' after the young is weaned. It is on its own to learn to forage. From 12 to 24 months after weaning the young leaves the natal area and begins to explore and travel before establishing its own home rang (Rismiller 1999, 2008). It remains on its own until sexually mature. Average age of sexual maturity is 7 years

(Rismiller, McKinley 2003). Outside of the breeding period individuals maintain a solitary lifestyle.

In contrast to the common mammalian paradigm of constant parental attention, once a puggle has left the pouch and is in the nursery burrow, the mother only associates with it for a few hours at intervals of 4 to 6 days. The nursery burrow is cool and dark. When the mother leaves, she backfills the burrow. (Rismiller, McKelvey 2009).

- Only take the puggle out of the nursery when it is to be fed. Return the puggle back to the burrow immediately after feeding.
- Keep the nursery in a quiet and dark or naturally lighted area
- Do not repeatedly disturb the puggle to see if it is all right
- Natural lowering of body temperature between feeding bouts ensures healthy digestion and growth

At weaning the mother opens the nursery burrow, brings the young out, suckles it, leaves and does not return.

- For the long term well being of the echidna, it is best to be hand reared in the same area where it can be released.
- Wean the young at about 200 to 220 days (Rismiller, McKelvey 2003)
- Do not feed or interact with the echidna after weaning

A young usually leaves the natal area. It can travel a great distance, some have been radio tracked for up to 40km from its burrow (Rismiller 1999).

Conclusions

The physiology and life style, i.e. the echidna's survival strategies, are different from any other Australian mammal. In order to appropriately care for or hand rear an echidna it is necessary to recognise the differences and provide suitable food, temperature and

housing as well as implement relevant handling techniques. Field studies on free ranging echidna populations have documented information that can be used for guidelines for care and natural hand rearing of echidnas.

Literature cited and where further information can be obtained:

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Peggy Rismiller is an environmental physiologist who has lived and worked in the field on Kangaroo Island for 25 years. Her major focus has been life history studies of short-beaked echidnas and Rosenberg's goannas in their natural habitats. She works with and supervises volunteers and students from around the world who are interested in holistic aspects of plant/animal interactions. She consults nationally and internationally with zoos, wildlife care groups and individuals on the care and rehabilitation of short-beaked echidnas. Peggy was awarded an OAM for services to science in 2006.