



captive breeding and maintenance of **Rough Knob-tailed Geckos**

Nephhrurus amylae and *N. asper*

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Introduction

Knob-tailed geckos are endemic to the more arid regions of Australia. There are a total of nine species, some of which are further divided into subspecies. The genus can be roughly divided into two groups; the smooth

knob-tails and the rough knob-tails. The latter group includes four species, *N. amylae*, *N. asper*, *N. sheai* and *N. wheeleri*. The latter two species are restricted to Western Australia and the northwestern Northern Territory and are poorly represented in captivity. The former two species are more widely maintained and will be dealt with in this article.

Centralian Knob-tailed Gecko (*N. amylae*)

This is the largest species in the genus, with records of snout-vent lengths close to 140mm. Needless to say, the poor excuse of a tail does not add much to the overall length! However, their size and robust build place them amongst the largest Australian geckos, at least by mass, with weights exceeding 50 grams. Bedford & Christian (1993) recorded one specimen of *N. amylae* (reported as *N. asper*) at over 61gms. It is also the spiniest of the group, especially over the posterior part of the body and hind legs.

Colouration is fairly consistent with an overall sandy brown to rusty brown background with scattered markings of a lighter shade. Some of the individual tubercles are light creamy-brown, especially on the flanks, often forming bands across the body, while others are slightly darker or the same as the background colour. There is usually a darker collar marking around the neck area. The head is often further marked with a reticulated pattern of thin dark lines. The underside is pale creamy-white. The eyes are large with a vertical pupil and tend to be greyish in colour and exquisitely patterned with delicate black lines.

True to its name, the Centralian knob-tail is restricted to the red centre of Australia around the Alice Springs area, north to Barrow Creek in the Northern Territory. Here it inhabits open or lightly wooded country on stony soils or rocky hillsides. The day is spent in shallow burrows or hiding beneath large rocks. Im-





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The Cape York population differs in that it may inhabit heath land vegetation as well as woodland or savannah. They are widespread and abundant over northeastern and central Queensland.

Captive Husbandry

As a reflection of the arid and severe characteristics of their natural

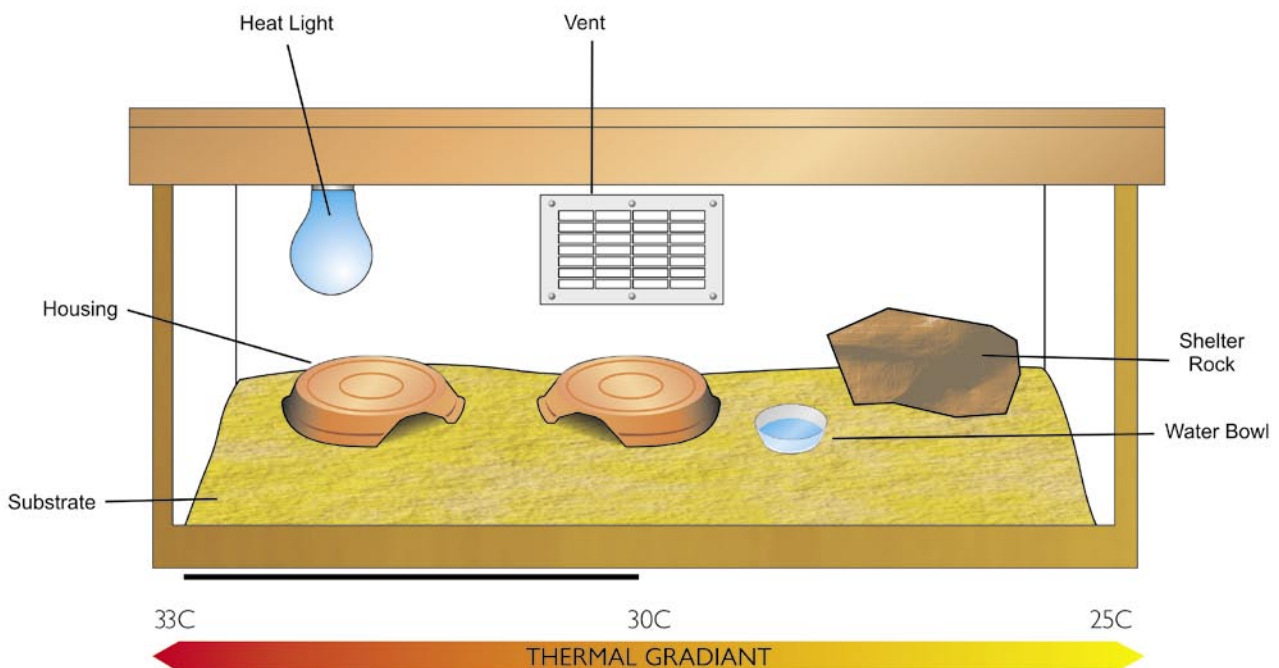
habitat, both *N. amya* and *N. asper* are tough and hardy captives. As long as temperature extremes, especially at the upper end, are avoided, there is no reason to believe these geckos would not happily survive in excess of 20 years in captivity.

Although normally solitary in the wild, they appear to be relatively tolerant of other specimens housed in the same enclosure; even two males

may be maintained together with or without females in some cases. Ideally, a group of a pair or three geckos (one male and two females) would be housed together. These may be successfully kept in one enclosure all year around, with breeding occurring regularly every year. However, some keepers believe they achieve better breeding success if sexes are kept apart for most of the year and simply introduced for breeding at the appropriate time.

An enclosure measuring around 60 x 30 x 30cm will adequately house a pair of *N. asper*, a little larger for a trio. For *N. amya* a bigger enclosure is required, say 75 x 30 x 30 for a pair 100 x 30 x 30 for a trio. All knob-tails are terrestrial lizards so no vertical height is required. In fact, if a cage with relatively smooth sides is used, e.g. a glass aquarium, no lid is required if the sides are over about 20cm as their robust built rather inhibits any agile movements such as jumping.

Good ventilation is essential. Most of the top of the enclosure should either be open or covered with



mesh to permit efficient air circulation. Ideally, this would be combined with some mesh vents around the enclosure sides nearer the base. This will provide an excellent airflow, the warmer air leaving through the top being replaced by cooler fresh air entering through the vents at the bottom.

Fine sand, such as red desert, beach or plasterer's sand make ideal substrates. They are cheap, readily available and easy to keep clean. A layer of approximately 4cm is provided for rough knob-tails. They are not avid burrowers (unlike the smooth species) as long as other shelter is provided. Some keepers maintain their rough knob-tails on a paper substrate quite successfully (Wagner & Lazik, 1996) and this is certainly better for hygiene purposes. However, I prefer a more natural cage covering and this also reduces cage maintenance. Once a week any droppings are removed from the sand surface, a task taking about a minute for each enclosure. Once every 2–3 months the substrate is totally replaced.

Other furnishings include a glass water dish approximately 3cm in diameter and 2cm deep and two or three up-turned flower pot saucers of appropriate size with an entry hole cut in one side. The geckos will readily use these as a home site and by providing several in different areas of the cage the lizard can choose a warm, cool, moist or dry home. A flat rock is also included, which is positioned directly over a heat pad. This provides a good thermoregulation area for the reptiles. A small amount of water is poured onto the sand on one side of one of the pot saucers once per week. This provides a moist, humid refuge if required by the animals. Sufficient water is added so that the sand almost dries out within the next 4–5 days.

As well as a low wattage heat pad underneath one end of the enclosure, a 25 or 40 watt incandescent light

bulb is also provided at the same end. The combination of these two will produce a heat gradient ranging from 32–33°C at the hottest point, down to mid to low 20's at the cooler end. In winter temperatures can be safely lowered a further 10–12°C and this cool period is important to ensure successful reproduction the following spring. Although ultraviolet light is probably not essential to these animals, a Reptisun 5.0 tube, controlled by a timer, is positioned 30cm above the substrate surface. This provides a strong, natural photoperiod, which is adjusted seasonally, as well as offering potentially beneficial ultraviolet light. The lizards are occasionally

seen active during the day, especially *N. amylae*.

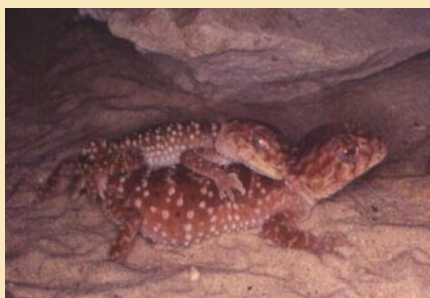
Knob-tails are not fussy eaters. Almost any suitably sized insect is a potential food item. My animals are maintained totally on a diet of cricket, gut-loaded with rodent pellets and fresh vegetables. Cockroaches, grasshoppers, mealworms, pink mice and even other small lizards would all be readily accepted. Feeding for adults takes place 2–3 times per week during the warm months, once a month during cooler times. If temperatures drop below 18°C no food is offered. Juveniles are offered food every second day. Food is dusted with a good quality calcium/multivitamin powder



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once per week and at other feeds only a calcium powder is used. Knob-tails will readily learn to accept food from forceps even during the day. Keepers should endeavour to practise this method as much as possible as it ensures each animal receives its fair share of food and it also guarantees that the food items is at its peak nutritionally when it is eaten. If the insect is allowed to run around the enclosure until the lizards opportunistically locate it, it may be 24 hours or more later before it is consumed. By this time the gut is probably empty (or filled with lizard droppings, which is the only food source in the cage) and the multivitamin/mineral dust has long since fallen off.

Captive Breeding



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Sexing adult rough knob-tailed geckos is relatively straightforward once the animals have reached around 12 months of age. Males are noticeably smaller than females in length and bulk in both species. They also possess a pair of hemipenal swellings at the base of the tail just anterior of the vent. Wagner & Lasik (1996) claim knob-tails may be sexed by these bulges at 3 months of age. The author has found sexing of rough knob-tails may still be problematic even at twelve months of age and is probably dependent on growth rates.

As mentioned above, sexes are kept in pairs or trios of one male and two females all year round. A winter cooling period of around two and a half months is provided, where temperatures are lowered to an ambient of 10–18°C with a hot spot of 26–27°C during the day only. In mid-August the temperatures are gradually raised in response to the prevailing natural temperatures and food offerings are rapidly increased. The first eggs are usually laid in October, indicating successful mating takes place the previous month. When egg laying is imminent, as illustrated by the white shells

being visible through the abdominal body wall of the gravid female, the sand beneath one home site is kept constantly moist by adding additional water. This area will be utilised by the female for an oviposition site. The eggs are usually buried some 30–100mm deep in the sand. Females will continue to produce clutches of eggs over the summer months with clutches spaced between 27–69 days apart. Clutches invariably comprise 1 or 2 eggs as with other gecko species.

Immediately after laying, the eggs are transferred to small 100ml clear plastic containers with a lid, which have been filled with moist sphagnum moss. The moss is soaked and then has most of the water squeezed out, giving an approximate ratio of dry sphagnum to water of 1:10 by weight. The clutch is embedded in the centre of the moss and the container is sealed. No ventilation holes are added and the container is not opened until the eggs hatch. This technique has produced a higher hatch success (approximately 95% hatch rate) with all types of gecko eggs than the more familiar vermiculite method.

Pails for Scales



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The sphagnum has a better moisture holding capacity while at the same time has more efficient airflow because of the air pockets amongst the moss.

Incubation temperature is maintained between 27–29°C and eggs hatch in around 69–84 days for *N. amya* and between 68–94 days for *N. asper*. Incubation times as long as 122 days have been recorded at lower temperatures (Annable, 1992). The first skin shed takes place within 12 hours of hatching. Hatching Queensland knob-tails weigh in around 2 - 3 grams and measure 37–43mm in snout-vent length, while their Centralian relatives are much larger at 3 - 4.5 grams and 44–54mm snout-vent length.

Neonates are transferred to small plastic lunchbox-type enclosures around 20cm x 15cm x 3cm in height with a 2cm deep fine beach sand substrate and a small upturned pot saucer. A small amount of water is poured onto the sand on one side of the saucer twice a week. Sufficient

water is added so that the sand dries out between watering. The box is then placed over a length of 9cm wide heat tape so part of the sand under the saucer is heated to a maximum temperature of around 32°C. A section of the box lid is cut away and replaced with aluminum insect mesh, which has been melted into the plastic lid around its edges using a soldering iron. A Reptisun 5.0 UV tube is situated 30cm above the substrate surface.

Hatchling rough knob-tails usually being feeding at around 10–14 days of age. Two or three week old crickets are an ideal size and these are offered three times per week and dusted with the same Reptical/Herpivite ratio as the adults at every second feed for their first 5–6 months. After this time, dusting is reduced to once per week. It is important not to introduce too many crickets to the enclosure at any one feed. The young lizards begin to stress if several insects start to crawl over their feet and bodies at the same time and then

refuse to feed. Two or three crickets per lizard are usually offered at each feeding session. Sexual maturity is usually reached after 2–3 years.

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