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MONITOR LIZARDS

Pygmy Rock Monitor

Varanus kingorum

One of the world's smallest monitors: a reddish-brown, dark-spotted rock dweller from northern Australia that grows to 18-40 cm including the tail. It lives on insects, is diurnal and bold in the enclosure, and needs many narrow hides, plenty of heat and a deep, slightly damp substrate to dig in.

Family: Varanidae

KEY FACTS

THE ANIMAL

Adult size	**18-40 cm** total length incl. tail
Lifespan	**8-12 years**
Active	**By day**
Lifestyle	**Rock-dwelling and terrestrial**
Habitat	**Savanna and rocky terrain**
Difficulty	**Intermediate**

CARE

Min. enclosure	**90 × 45 × 45 cm** L × W × H for 2 adults
Temperature, day	**27-32 °C**
Basking spot	**45-50 °C**
Temperature, night	**18-22 °C**
Humidity	**40-60%**
UVB	**Recommended** Ferguson zone 3
Diet	**Insects**
Kept	**Singly or in pairs**

BREEDING

Reproduction	**Egg-laying**
Sexually mature	**6-10 months**
Clutch size	**2-4 eggs**
Incubation	**89-126 days** at 27-31 °C

PROTECTION AND PAPERWORK

CITES	**Appendix II**
EU annex	**Annex B**
IUCN	**Least Concern (LC)**

About the species

Varanus kingorum belongs to the subgenus *Odatria*, the Australian dwarf monitors, and is among the very smallest in the whole genus. It reaches 18-40 cm including the tail, and more than half the length is tail. Most animals in captivity reach 18-23 cm, and only a few approach 40 cm. The body is slender with short, strong legs and claws that are short, thick and strongly curved. The ground colour is reddish brown to orange with dark spots and net patterns, and the head scales are smooth. The tail is long and not striped, which distinguishes the species from its closest relatives among the dwarf monitors.

The species was described in 1980 by Glen Storr and is named after two Australian naturalists, Richard Dennis King and Max King, the latter of whom collected the first animal. It is still rare in captivity. Today the animals in the trade come from captive breeding. A pale, leucistic form with white to peach colour has been bred in captivity, and most captive-bred animals carry the gene for it.

Although it is small, *V. kingorum* is a true monitor: intelligent, curious and an eager hunter. It quickly learns to associate its keeper with food and can take insects directly from tweezers or a hand. This makes it one of the most manageable monitors for an experienced keeper, but it is not a beginner's species. It needs a lot of heat, a specially furnished enclosure and a steady supply of live insects, and there is little experience of getting it to breed reliably.

How old the species gets in captivity is not documented. The lifespan in the fact box is estimated from other small dwarf monitors and must be taken with reservation. Expect to care for the animal for a number of years, and the food bill adds up, because live insects are needed every other day all year.

Read more: Buying animals: captive-bred, wild-caught and transport

Distribution and habitat

Varanus kingorum is found only in northern Australia: in the north-western part of the Northern Territory and the north-eastern part of Western Australia, in the Kimberley region and adjacent areas. The type locality lies about 10 km west-north-west of Timber Creek in the Northern Territory.

The range is relatively small and tied to rocky areas. The species is shy and hard to spot in the wild. It is assessed as Least Concern on the IUCN Red List.

> **Native range:** Australia.

HABITAT

The species lives on rock outcrops and rocky slopes with open scrub, thicket and grass. In the Kimberley and the Northern Territory the climate is tropical with a distinct wet and dry season, so the landscape alternates between dry, hot months and a humid season. The animals move mostly in crevices between the stones and seek cover in narrow cracks when startled.

That the species comes from a dry area does not mean that the air around it is dry. The microhabitat it uses, in crevices, under stones and in the soil, is more humid than the surroundings. The food consists of insects, including grasshoppers, termites and insect eggs. Both adults and newly hatched juveniles use the long tail to flick prey out of narrow crevices.

Care

THE ENCLOSURE

An adult pair needs an enclosure of at least 90 × 45 × 45 cm (length × width × height), and larger is better. The shape is low and long, because the species lives on the ground and among stones. If there is room for more length, the temperature gradient from the warm to the cold end becomes greater. Juveniles can be kept in a smaller box for the first few months, but they grow quickly and are near adult size after about six months.

The most important part of the furnishing is narrow hides. The species feels secure only when the hide almost touches its back, and a tall hide leads to stress and poor wellbeing. Stack several layers of long, thin pieces of cork bark or flat stones on top of each other, so that the animal can choose between different temperatures. Lay the hides lengthwise from the warm to the cold end, so that the animal can move between them without crossing open ground. Stones must be firmly fixed, so that they cannot fall onto a digging monitor. Paradoxically, the animals become bolder and more visible the more hides they have.

As substrate, use a deep layer, 15 cm or more, of a mixture of clean soil, sand and a little peat. It must be slightly damp, so that it holds together, but never wet. It is normal for the top layer to dry out under the heat lamp, as long as the deeper layers hold the moisture. The animal digs, so give it room to make tunnels. The lid must be tight, and all heat sources must be shielded, so that the animal cannot burn itself on the bulb.

Read more: Heat and temperature

TEMPERATURE

The species needs a lot of heat. Under a basking spot the surface temperature must be 45-50 °C, measured with an IR thermometer directly on the stone or bark, not in the air. This is only a small area. The rest of the enclosure must provide a broad gradient so that the animal can choose: 27-32 °C in the main part and about 27 °C or slightly cooler at the cool end. Measure the air temperature with a digital thermometer with a probe at both ends, and use a thermostat for all heat sources.

At night the temperature may fall to ordinary room temperature, 18-22 °C. The animal tolerates the occasional winter night down to about 16 °C, provided it has a clearly hot basking spot to reach in the morning. Halogen spots or mercury vapour lamps of 75-100 W provide the necessary heat, and they must be mounted out of the animal's reach. Under the radiation there must also be shade, so that the animal can cool down. The stone under the lamp can get very hot, so it must not lie directly against the glass.

HUMIDITY AND WATER

The air in the enclosure can be relatively dry, about 40-60 %, but the substrate must be kept evenly damp. Add small amounts of water to the soil at regular intervals, and do not pour in water in large quantities. The stacked hides trap the moisture from the soil and form damp hides, which help with shedding and health. Keep a low, stable bowl of fresh water available, and change the water regularly.

In juveniles humidity is particularly important, because they dry out quickly at the high temperatures. Make sure the juveniles' substrate never dries out completely, especially under the hides. Very wet conditions, on the other hand, cause skin and scale problems, so the ventilation must be good.

Read more: Humidity, misting and ventilation

LIGHTING AND UVB

The species is diurnal and does best with strong light and UVB. Use a combination of a heat bulb and a UVB tube, for example a 10-12 % T5 tube over the warm part of the enclosure. The species is a sun-basker (Ferguson zone 3), so the UV index right at the basking spot should reach about 3-7 and be lower in the rest of the enclosure. The animal must always be able to seek shade. Replace the UVB tube according to the manufacturer's instructions, typically every 12 months, because the output falls over time.

Give a 12-hour day in summer and 10-11 hours in winter, controlled by a timer. All light and heat must be off at night.

Read more: Lighting and UVB

FEEDING

Varanus kingorum lives exclusively on insects. Fast insects such as crickets and red runner roaches are clearly preferable to slow dubia roaches and mealworms. Let the insects run freely in the enclosure, because the species is skilled at finding them in the hides. The insects should be about as large as the animal's head.

Juveniles are fed every day, adults every other day with six to twelve insects per animal. Dust all insects with calcium with vitamin D3. Rodents and other vertebrates do not belong in the diet, because the species lives only on arthropods in the wild. Vary the insects, so that the diet does not become one-sided, and let the feeder insects eat well before they are given to the monitor.

Read more: Feeder animals: keeping and breeding Read more: Calcium, vitamins and supplements

BEHAVIOUR AND HANDLING

V. kingorum is bold and active in the enclosure and moves around in the open during the day when it has plenty of hides. It is fast and can jump onto the hand when it sees food. Bites and claws from such a small animal seldom cause serious injury, but the claws can scratch, and the animal can bite in panic. Short, calm sessions several times a week make the animals tame, and males are best suited to handling. Hold the animal low over the substrate, do not take hold of the tail and support the body. Do not handle females carrying eggs, as stress can cause problems with egg laying.

Like all reptiles, monitors can carry salmonella. Wash your hands thoroughly after any contact with the animal, enclosure and food, and do not let children put their hands in their mouths after handling.

The species is kept singly or as a pair. A pair usually lives peacefully together, but the male must be removed for one to two months if his mating attempts prevent the female from eating and basking in peace. Do not keep two males together, and not animals of very different size, because larger animals may eat smaller ones.

Read more: Quarantine and hygiene

Breeding

SEXUAL MATURITY AND SEXING

Males are larger and more heavily built than females, and the head is broader and more muscular. The female's head is narrow and slender. The pattern is often clearer in males. The sex is hard to see in juveniles but becomes clear once you have seen several adults. Probing is unreliable in monitors, so reliable sexing of young animals requires a vet, for example with ultrasound or endoscopy.

The species grows quickly. Some animals can become adult and breed as early as six months, but it is more likely after eight to ten months. Give the female time to grow and gather strength before she is bred.

MATING

A winter rest is not documented as necessary for breeding. A pair can be kept together all year round, and mating takes place when both animals are in good condition. Follow the pair closely, and remove the male temporarily if he disturbs the female. New pairs and young females often need several attempts before the eggs are fertilised, so do not be discouraged by infertile first clutches.

Breeding is the hardest part of keeping the species, and experience is still limited. The female must have plenty of food and calcium throughout the period.

EGG-LAYING AND CLUTCHES

The female lays small clutches of two to four eggs every two to four weeks, and some females can go several months without laying. The eggs are large in relation to the size of the female. A gravid female becomes visibly round, and the eggs can be seen through the thin belly skin.

A suitable egg-laying site is essential. Give the female a deep layer, about 15 cm, of sandy soil with a little moisture, kept at 28-29 °C. She digs several trial holes and may bury herself completely and disappear for a couple of days. Do not disturb her. If the site is not good enough, she may retain the eggs and become egg-bound, resorb the clutch or scatter the eggs on the surface. After laying she looks like an empty balloon. Give her as many calcium-dusted insects as she will eat, and she will normally have regained her weight within a week.

INCUBATION

Carefully move the eggs to a small container with a mixture of vermiculite and water in the ratio 1:1 by weight, with one small hole in the lid so that no pressure builds up. Keep a constant temperature of about 29 °C, within 27-31 °C. Use a thermostat-controlled incubator.

The eggs hatch after 89-126 days, typically after about 120 days at about 29 °C. Temperature-dependent sex determination has not been documented in the species. Eggs that collapse or go mouldy are usually infertile, but wait until you are sure before you remove them.

Read more: Incubating eggs

REARING THE YOUNG

The hatchlings are relatively large when they hatch, compared with the adult size. An animal that hatches without help is usually very hardy. Keep the clutch's siblings together in a small enclosure with the same furnishings as the adults: narrow hides, deep damp substrate and a warm basking spot. Humidity is particularly important for the hatchlings, because drying out happens quickly at the high temperatures.

Feed daily with small, calcium-dusted insects about as large as the hatchling's head. The hatchlings grow quickly and approach adult size after about six months. Split them up when unrest or differences in size appear.

Health and common mistakes

Varanus kingorum is hardy when temperature, light and hides are right, but a number of mistakes recur:

- Too little heat or too weak a basking spot. This causes poor digestion, loss of appetite and a weakened immune system. Measure the surface temperature with an IR thermometer.
- Lack of calcium and D3 or too weak UVB. This causes metabolic bone disease with soft jaws, bent limbs and tremors, especially in juveniles and egg-laying females.
- Stress from too few or too tall hides. The animal hides, does not eat and does not thrive.
- A substrate that is too dry or constantly wet, causing problems with shedding and scale diseases.
- Egg binding and reabsorption of eggs if there is no good lay site.
- Parasites, especially in wild-caught animals. Animals in the trade are captive bred, which means fewer problems. New animals should have a quarantine of at least six weeks, and a vet experienced with reptiles should examine a faecal sample.

Watch for clear eyes, a plump tail base and a good appetite. Contact a vet if the animal loses weight, will not eat or seems limp. Never give medicine without the vet's instructions.

Read more: Common diseases and signs of illness

Always ask someone who knows

This guide is a good place to start, but it cannot replace experience. Animals differ, and much of what matters most is learned from people who have kept the species for years. Talk to a breeder, an experienced keeper or a vet who knows reptiles and amphibians before you get the animal - and again if anything looks wrong.