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MONITOR LIZARDS

Line-tailed Pygmy Monitor

Varanus caudolineatus

Varanus caudolineatus is one of the smallest monitors in the world: a diurnal, semi-arboreal pygmy monitor of 25-32 cm from the dry scrubland of Western Australia. It lives in crevices under loose bark and in hollow trees, feeds on insects and small lizards and is rare in captivity. The species has been bred in captivity, but husbandry knowledge is sparse, and part of the guidance is based on related pygmy monitors.

Family: Varanidae

KEY FACTS

THE ANIMAL

Adult size	**25-32 cm** total length incl. tail
Lifespan	**8-12 years**
Active	**By day**
Lifestyle	**Arboreal**
Habitat	**Semi-desert**
Difficulty	**Experienced**

CARE

Min. enclosure	**80 × 50 × 100 cm** L × W × H for 2 adults
Temperature, day	**28-34 °C**
Basking spot	**45-55 °C**
Temperature, night	**20-24 °C**
Humidity	**30-60%**
Water	**Water dish**
UVB	**Recommended** Ferguson zone 3
Diet	**Insects**
Kept	**Singly or in pairs**

BREEDING

Reproduction	**Egg-laying**
Clutch size	**3-6 eggs**
Clutches per year	**2-4**
Incubation	**77 days** at 29-31 °C

PROTECTION AND PAPERWORK

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

About the species

Varanus caudolineatus belongs to the pygmy monitors (subgenus *Odatria*) and was described in 1885 by George Albert Boulenger. The tail is short, broad and flattened, at most 1.25 times as long as the body, with strongly keeled scales in complete rings. After some spots at the front, the tail has four to six broken longitudinal stripes, which gave the species its scientific name (*caudolineatus* means "line-tailed"). The ground colour is greyish to yellowish with large brown to black spots, and some animals have a reddish brown band down the back. The head and neck are darker and more densely spotted, and a distinct dark stripe runs across the temple. The closely related *Varanus gilleni* has rounder, less prominent scales on the back and an almost unspotted belly.

The total length reaches about 32 cm. Adults are probably 25-32 cm; the lower limit in the box is an estimate. The animals become sexually mature at a snout-vent length of about 9 cm, and the largest reach 13 cm for males and 12 cm for females. Northern populations grow larger than the southern ones and look more like *V. gilleni*. The males may be slightly larger than

the females, but the difference is not certain. Weight is not known.

The species is rare in captivity and is bred far less often than *V. gilleni*. In zoos only two animals have been recorded, both males in Europe. The species has been bred over several generations, and there are figures for clutches, incubation and juveniles, but almost nothing about husbandry itself. Temperatures, enclosure dimensions and food are therefore based on wild animals and on related pygmy monitors, especially *V. gilleni* and *Varanus similis*.

A lifelong commitment: the animal is small and requires neither a large enclosure nor expensive food, but it requires a warm, bright setup all year round, live insects and a keeper who is willing to adjust the care along the way, because there is no answer key. Lifespan in captivity is not known; the figure in the box is an estimate based on related pygmy monitors, and the animal must be regarded as a responsibility for a number of years.

Read more: Incubating eggs

Distribution and habitat

Varanus caudolineatus is found only in Western Australia. The type locality is Champion Bay at Geraldton, and the species has also been found from Carnarvon and Minilya in the west to Laverton and Lake Nabberu in the east, and from Tambrey Station and Meekatharra in the north to Cadoux in the south, including at Yalgoo, Cue and Nannine. The range extends from the coast at Geraldton and Carnarvon into the dry and semi-arid interior of the state.

It is not found in the rest of Australia. The species is easily confused with *Varanus gilleni*, which lives in central Australia among other places, but the two ranges do not overlap according to current records.

> **Native range:** Australia.

HABITAT

Varanus caudolineatus lives in scrub, open woodland and grassland dominated by acacias (including mulga) and spinifex grass. The animals stay in trees and shelter in crevices under loose bark, in hollow trunks of mulga and eucalyptus and among boulders. Foraging often takes place on the ground, however, and the animals may enter burrows in the ground after prey.

The species is diurnal but relatively sedentary. It only becomes active in the hottest hours, when the temperature has risen to 30-45 °C, and it typically moves only about 34 m from its tree. The same tree is used for about three days at a time, and the animal may stay in it for up to 15 days without leaving. Several animals can share a small area: up to four animals can live within 500 m², and males and females are fairly tolerant of each other. Mating probably takes place in July and August, and the females lay their eggs in November and December, that is, at the beginning of the Australian summer. The climate is dry with very hot days.

Care

THE ENCLOSURE

One animal or a pair needs an enclosure of at least 80 × 50 × 100 cm (length × width × height), and height is more important than floor area, because the species lives on trunks and under bark. Larger is better.

Furnish with many tight hiding places. Cork tubes, cork bark on the back wall and vertical trunks with loose bark provide the crevices the species seeks in the wild. The hiding places must be narrow, so the animal can squeeze in. Do not remove the hiding places to get the animal to come out: that makes it stressed, not tame.

The substrate should be deep enough for the animal to dig and for moisture to stay at the bottom: 5-10 cm of soil mixed with sand is suitable. Let part of the floor be slightly damp, so it can be used as a laying site. A laying box or a deep tray with damp soil and sand placed high in the enclosure works well as a nesting site.

Heat sources must be shielded: all bulbs and spots must sit behind mesh or in fittings, so the animal cannot burn itself. The door must close tightly. Dwarf monitors find every gap, and an animal of 25 cm escapes through a small hole.

Young can at first be kept in a smaller tray or a small enclosure of about 60 × 30 × 30 cm, but must be moved up as they grow.

TEMPERATURE

Varanus caudolineatus is active when the air is 30-45 °C, so the enclosure must allow high temperatures.

- Background by day: 28-34 °C.
- Basking spot: 45-55 °C surface temperature on a branch or a stone, measured with an IR thermometer. Start at the low end.
- Night: 20-24 °C. The night may be cooler than the day, but it must not become cold.
- There must be a large temperature gradient, so the animal can choose between the basking spot and a cool hiding place.

Use halogen spots or other heat bulbs with a thermostat, and measure both surface and air. Animals that lie in hiding all day without coming out to bask are either too cold or stressed. Whether the species needs a cool winter period is not known.

Read more: Heat and temperature

HUMIDITY AND WATER

Varanus caudolineatus comes from dry regions in Western Australia, and the humidity in the enclosure should be about 30-60 %, with a moister corner at the bottom of the substrate and drier air at the basking spot.

Provide a shallow, stable water bowl with fresh water, changed daily. The animal probably also drinks droplets from sprayed surfaces, so a light spray of part of the enclosure a couple of times a week is enough. Keep ventilation good, and avoid a constantly wet floor, which causes fungus and skin problems.

Read more: Humidity, misting and ventilation

LIGHTING AND UVB

Varanus caudolineatus is diurnal and basks in the heat, so it does best with strong light and UVB. Use a UVB tube (T5 or equivalent), mounted over a favourite resting place, so that the UV index at the basking spot is about 3-4 (Ferguson zone 3), and possibly an extra UV spot, switched on briefly each day. The zone is an estimate based on the species basking a great deal. There must be shade in the rest of the enclosure.

Keep the light on for 12 hours a day. Provide a powerful daylight bulb or a halogen spot at the basking spot. Replace the UVB tube according to the manufacturer's instructions, typically after 12 months, because the UV output falls even though the tube still lights up.

Read more: Lighting and UVB

FEEDING

In the wild *Varanus caudolineatus* lives mostly on arthropods: cockroaches, grasshoppers and other insects, spiders and scorpions, and more rarely centipedes, beetles, cicadas and moths. Small lizards are also taken, especially geckos, and geckos that are too large to overpower may be attacked in order to get hold of the discarded tail. This fits with a diet of live insects in captivity.

In captivity the diet consists of: - Cockroaches (for example dubia), grasshoppers and crickets of suitable size, so that the insects are not larger than the animal's head. - Variety: large grasshoppers with moving wings trigger a strong hunting response in pygmy monitors. - A small piece of meat or a pinky mouse now and then, especially for gravid females, not as a staple food.

Dust the food with calcium and a multivitamin supplement; the need for D3 depends on how much UVB the animal receives. As a starting point, adults get 3-4 small meals a week and juveniles more often; adjust according to body shape. Pygmy monitors readily take too much, so obesity is a risk. Give gravid females more protein and supplements.

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

BEHAVIOUR AND HANDLING

Varanus caudolineatus is so small that bites and claws are unlikely to cause serious injury, but the animal can both bite and scratch, so handling should be calm and brief. Tail whipping is hardly a problem at this size. Captive-bred pygmy monitors can become tame, while wild animals are shy and flee or hide, which is natural behaviour and not a sign of illness. Do not remove the hides to get the animal out.

Handle the animal only when necessary, and let it come to an open hand. Never grab the tail. Wash your hands before and after, since monitors can carry salmonella; this also applies if you have only touched the furnishings in the enclosure. Children should not handle the animal without supervision.

Socially the species is tolerant in the wild, where several individuals can share an area, and males and females are fairly relaxed with each other. In captivity it is kept singly or in pairs. Start with one animal, or a pair that can be separated if unrest arises. As with *Varanus gilleni*, the male is removed before the female lays eggs.

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

Breeding

SEXUAL MATURITY AND SEXING

Size and colour are not a reliable sign of sex in *Varanus caudolineatus*, and the males are at most slightly larger than the females. On the other hand, the species is easy to sex by transillumination of the base of the tail with a powerful light source in a dark room: the male's hemipenes can be seen as elongated red ovals, and the female does not have them. The method works in many small species from a snout-vent length of about 5 cm.

Females are sexually mature at a snout-vent length of about 8-9 cm and males at about 9 cm. The age is not known, but is probably about two years, as in a well-fed *Varanus similis*.

MATING

In the wild mating probably takes place in July and August. A pair can be kept together all year, as in the closely related *Varanus gilleni*, preferably with periods apart in the Australian winter (May to September). The male chases the female, checks her with his tongue and scratches her back, and mating can take place in hiding.

Feed the female well before and after mating. Remove the male in good time before the female is to lay eggs, so she can lay them without stress. In the close relative *Varanus similis* the eggs are laid about four to six weeks after mating, and the female's increased appetite and thicker body are a sign that mating has succeeded.

EGG-LAYING AND CLUTCHES

Females of *Varanus caudolineatus* lay 3-6 eggs per clutch, in the wild in November and December. Wild females can lay up to four clutches in a season, and in captivity it is typically two to three clutches a year. Give the female plenty of food and calcium throughout the season.

Have a laying box ready, for example a wooden box filled with a mixture of soil and sand, high in the enclosure, or a deep tray on the floor at at least 27 °C. Offer several sites if you can. In the related *Varanus similis* the eggs are buried deep, and the nest is carefully covered. The female must be fed generously after laying to recover.

INCUBATION

Eggs of *Varanus caudolineatus* hatch after about 77 days at 29-31 °C. The figure is based on few eggs.

Move the eggs carefully and keep them with the same side up, so they are not turned. Mark the top. Place them half-buried in damp perlite or vermiculite in a closed plastic box with small air holes in an incubator. Eggs tolerate dryness better than too much moisture: a wet substrate quickly causes irreparable damage. Drip a little water into the corners after 2-3 weeks without touching the eggs.

REARING THE YOUNG

At hatching the juveniles of *Varanus caudolineatus* are about 12 cm in total length, 5 cm from snout to vent and weigh 1.5-2.5 g. As in related pygmy monitors, the juveniles eat small crickets, cockroaches and grasshoppers dusted with vitamins from the first days, and they can be kept together for the first months, until the sex can be seen or problems arise with feeding. Then they must be separated to avoid bites and stress.

Keep juveniles in a small enclosure with hides, a low water bowl, heat and UVB. Use paper towels on the bottom until the navel has closed, and then switch to soil and sand. The growth rate is not known.

Health and common mistakes

Varanus caudolineatus has the same typical problems as other small, diurnal monitors in captivity:

- Too low a temperature or no basking spot, which causes poor digestion and loss of appetite.
- Obesity in animals given too much food or too fatty a diet (pinkies every day).
- Lack of calcium and D3 from missing UVB or supplements: soft jaws, bent limbs and tremors.

- Skin problems and fungus from a constantly wet substrate.
- Parasites and stress in newly bought, wild-caught animals. Have the animal examined for intestinal worms and protozoa by a vet experienced with reptiles.
- Egg-laying problems (dystocia) in females without a suitable laying site or with too little calcium.

A healthy animal has clear eyes and a plump tail and is active in the heat. See a vet if the animal loses weight, does not eat for several weeks or lies limp in hiding in the middle of the day. Always keep hygiene in order, because monitors can carry salmonella.

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.