herpy

MONITOR LIZARDS

Lace Monitor

Varanus varius

Varanus varius is a powerful, diurnal climbing monitor from eastern Australia. It grows to about 2 m including the tail, is the closest living relative of *V. komodoensis* and as an adult needs a whole room or a large outdoor enclosure. It is not an animal for beginners, and only little detailed care information exists.

Family: Varanidae

KEY FACTS

THE ANIMAL

Adult size	**100-200 cm** total length incl. tail
Weight	**3,000-14,000 g**
Lifespan	**10-15 years**
Active	**By day**
Lifestyle	**Arboreal and terrestrial**
Habitat	**Savanna and temperate woodland and meadow**
Difficulty	**Expert**

CARE

Min. enclosure	**400 × 200 × 200 cm** L × W × H for 1 adult
Temperature, day	**28-35 °C**
Basking spot	**45-60 °C**
Temperature, night	**18-24 °C**
Humidity	**40-70%**
Water	**Water dish**
UVB	**Essential** Ferguson zone 3
Diet	**Insects and vertebrates**
Kept	**Singly**

BREEDING

Reproduction	**Egg-laying**
Sexually mature	**24-60 months**
Clutch size	**4-14 eggs**
Incubation	**180-270 days** at 29-30 °C

PROTECTION AND PAPERWORK

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

About the species

Varanus varius is the second-largest monitor in Australia. Adults average 150-160 cm and reach about 2 m at most in total length, and the snout-vent length reaches up to 77 cm. Wild animals rarely weigh more than 7 kg, but near human settlement and in captivity they can become much heavier, up to 14 kg or more. The males are up to 20-30 % larger than the females and have a broader, stronger head and a more pronounced snout. The tail is round at the base and compressed towards the tip.

The ground colour is dark grey to blue-black with scattered cream spots, and the head and snout have distinct black and yellow bands that continue under the chin and throat. The tail is densely cross-banded. Young animals have a sharper, cleaner pattern than the adults. Towards the south the animals are more banded, towards the north more spotted. There is also a pale form with strong dark grey and yellow bands all the way down the body, called Bell's form, which is seen especially west of the Great Dividing Range in Queensland and New South Wales. It is a hereditary colour variant and not a separate species.

The species was described in 1790 and is the type species of the whole genus *Varanus*. It is not divided into subspecies, but genetic studies distinguish three lineages: one in northern Queensland, one inland and one along the coast. The closest living relative is *V. komodoensis*.

It is a strong, curious and intelligent species with very long, sharp teeth and powerful claws. The salivary glands produce toxins that affect blood pressure and the blood's ability to clot. The venom has only a slight effect on humans, but the teeth can cause serious wounds.

Lifelong commitment: *V. varius* needs a home-built room or a large outdoor enclosure, large feeder animals every week and a keeper who dares and is able to handle a strong animal of 1.5-2 m that can bite. Lifespan is typically 10-15 years, but animals in captivity can live up to 40 years. The cost of food, the space and the time are large, and it is hard to find a new home for a fully grown animal.

Read more: Feeder animals: keeping and breeding

Distribution and habitat

Varanus varius lives in eastern Australia, from Cape Bedford on the Cape York Peninsula in Queensland through New South Wales to Victoria, and there is a separate population in south-eastern South Australia. It is found both on the coast and a good way inland, including in the Murray-Darling Basin.

The type locality is probably the Sydney area in New South Wales.

> **Native range:** Australia.

HABITAT

Varanus varius lives in open and dense forest, in riverside forest fringes and in dry scrub with low trees. It is often seen in large trees, but forages on the ground and can cover up to 3 km a day. If disturbed, it flees up the nearest tree. Young animals live more in the trees than adults, and an animal can use the same tree for years. Large males have territories of about 65 hectares.

The animals are most active from September to May. In cool weather they are inactive and hide in hollow trees, under fallen trunks or under large stones, and the males move much less in winter. The eggs are laid in active termite nests on the ground or in the trees: the female digs a hole in the side, lays the eggs and lets the termites close the nest again. The eggs remain in the nest for 6-9 months, and the female probably returns and opens it when the juveniles are to come out.

The species eats mainly mammals, live or as carrion, and also insects, reptiles, birds and eggs. In the coastal forests of south-eastern Victoria the marsupial *Pseudocheirus peregrinus* made up almost two thirds of the prey, and larvae and pupae of beetles and butterflies were also eaten often. The animals are often seen at campsites, chicken runs and rubbish bins.

Care

THE ENCLOSURE

One adult needs an enclosure of at least 400 × 200 × 200 cm (length × width × height). The enclosure must be at least twice as long and as wide as the animal, and the largest animals reach about 2 m. An animal of 150-160 cm needs at least 320 × 160 cm. The height is an estimate based on the fact that the species climbs a great deal. An enclosure for two animals must be at least 50 % larger. The best solution is a large, secure outdoor enclosure when the climate allows it, otherwise a whole room.

Juveniles can start in a spacious enclosure of about 120 × 60 × 80 cm, but they grow quickly and must be moved up within a few years. Home-built rooms of waterproof wood or boards with a glass front work well. All joints must be tight and the doors must be lockable, because the animal is strong and can open simple locks.

Furnish with thick, solid branches and climbing shelves at several heights, piles of stones and several large hiding places, both dry and slightly moist. For the substrate use a deep, slightly moist mixture of soil and bark chips in which the animal can dig and the female can lay eggs. All heat sources must be shielded so that the animal cannot burn itself on them or pull them down.

TEMPERATURE

Varanus varius is diurnal and basks a lot. The basking spot must be a large, warm surface where the surface reaches 45-60 °C. This is a surface temperature measured with an IR thermometer, not air temperature. The background temperature by day is set at about 28-35 °C, and at night it can fall to 18-24 °C. There must be a large temperature gradient so that the animal can choose its temperature and cool off in the shade.

The figures for background and night are an estimate based on the species living in a temperate to subtropical climate and being inactive in cold weather. Watch that the animal actually uses the basking spot and does not remain cold and sluggish. A winter rest in captivity is not documented and is therefore not given. Use a thermostat on all heat sources, and shield the lamps with mesh or a grille.

Read more: Heat and temperature

HUMIDITY AND WATER

The species does not require high humidity, and 40-70 % is a reasonable starting point (an estimate, not documented for captivity). The enclosure must have both dry areas and a more humid corner so that shedding goes easily. Juveniles benefit from a slightly damp substrate for shedding.

Provide a large, heavy bowl of fresh water that the animal can lie fully submerged in. It quickly becomes dirty and must be emptied and cleaned at least once a day. A heavy bowl is important, because a large animal easily tips over a light one.

Read more: Humidity, misting and ventilation

LIGHTING AND UVB

As a diurnal species that basks a lot, *Varanus varius* needs strong light and UVB. Use powerful UVB tubes or lamps (Ferguson zone 3) over the basking spot, so that the animal can lie close to the light but also withdraw into shade. Replace the tubes according to the manufacturer's instructions, because UVB output declines over time. Real sunlight is best, and a secure outdoor enclosure in the warm part of the year is a great advantage, as long as the animal cannot escape.

Keep the light on for about 12-14 hours in summer and shorter in winter, controlled by a timer. Hang the lamps so high that the animal cannot reach them.

Read more: Lighting and UVB

FEEDING

In the wild the species eats mainly mammals and carrion and also insects, reptiles, birds and eggs. Detailed feeding plans for captivity are not documented for the species, so the main rule is borrowed from other large monitors. Adults get whole, thawed food animals: mice, rats, chicks and quail, supplemented with boiled eggs and large insects. Give the food with long tweezers or tongs, and place it on a clean surface so that the animal does not swallow substrate. Juveniles get insects and small mice or chopped pieces of mice and chicken, which are put out so that they can eat in peace.

Juveniles are fed 3-4 times a week, adults about 1-2 times a week, adjusted to weight and exercise. Obesity is the most common problem in monitors in captivity, because rodents are fatty and the animal moves less than in the wild. Alternate between rodents, birds and insects, and do not give more than the animal can burn off. Calcium with D3 is given according to the manufacturer's instructions. The animal swallows large pieces whole, so sharp bones and plastic must never get into the food.

Read more: Calcium, vitamins and supplements

BEHAVIOUR AND HANDLING

Safety: *Varanus varius* is strong and fast and can bite, scratch and lash with its tail. The teeth are long and sharp, and a bite can cause deep wounds that bleed heavily, swell and hurt for hours. Wounds must be cleaned thoroughly and seen by a doctor. The tail can whip hard, and the claws tear the skin when the animal climbs up a person. Adult animals are dangerous to handle without experience, so preferably handle large animals while another person is present.

Calm, predictable movements are the most important thing in handling. Newly hatched juveniles are often very shy and defensive, and they need peace until they have got used to your movements. If they are constantly disturbed, they hide most of the time. After that they can gradually be tamed by feeding with tweezers, so that they get used to the hand. A tame animal is never completely predictable. Keep the animal away from children and small pets.

In the breeding season the males fight by rising on their hind legs and grappling with each other. Therefore keep the animals singly, and only put a pair together under supervision in a very large room. Like all reptiles, the species can carry salmonella, so wash your hands thoroughly after any contact with the animal, droppings, water and enclosure.

Read more: Quarantine and hygiene

Breeding

SEXUAL MATURITY AND SEXING

In *Varanus varius* the males grow 20-30 % larger than the females and have a broader head, a more pronounced snout and often a stronger reaction at feeding. In adult males hemipenal bulges can be seen at the base of the tail, but they are hard to see in juveniles. X-ray can show ossifications in the hemipenes of sexually mature males. In the wild the males mature at a snout-vent length of about 42 cm and the females at about 39 cm. In captivity the animals mature after 2-3 years, in the wild only after 4-5 years.

MATING

Varanus varius has been bred many times in captivity, the first time outside Australia in the early 1990s. The breeding season is triggered by rising temperature and more food in spring, and in the wild it lasts from about September to December. Up to six males can gather around a receptive female and fight over her by rising on their hind legs and holding on to each other. Mating can last several hours. In captivity the male pursues the female persistently with tongue flicks and jerky movements, and they mate regularly over one to two weeks.

The male must be taken out before the female lays eggs. Mating requires very large rooms and close supervision, because violent males can injure the female. A winter rest for animals in captivity is not documented.

EGG-LAYING AND CLUTCHES

The eggs are laid 22-36 days after mating. When the female ovulates, she looks bloated and unwell and may hang from the branches to relieve the pressure on the internal organs. Her appetite falls, and towards egg laying she refuses all food. A clutch consists of 4-14 eggs, on average about 8. In the wild the eggs are laid in termite nests.

In captivity the eggs are laid in soil or bark chips, and the substrate must be deep, damp and warm. Give the female a large, deep egg-laying box. Females in captivity can lay several clutches in a season, but how many is not documented.

INCUBATION

The eggs have a long incubation period, as is typical of large monitors. Use perlite mixed with roughly the same weight of water, and keep the temperature at about 29-30 °C. The eggs then hatch after 180-270 days, most often around 260 days. The eggs must not be turned, and the box must have small air holes and be checked regularly for mould. Whether sex depends on temperature is not documented.

Read more: Incubating eggs

REARING THE YOUNG

The juveniles are often very shy and defensive, so they should not be handled until they have become secure. Give them many hides, a slightly damp substrate that helps shedding and the opportunity to dig. Put the food out so that they can eat in peace: chopped mice, pieces of chicken and insects stimulate the appetite. Feed often, and dust with calcium and D3. Juveniles live more in the trees than adults and need branches to climb. Keep the juveniles separate so that they do not stress or injure each other. How quickly they grow is not documented.

Health and common mistakes

There are only few health data for *Varanus varius* specifically, so this section is based on experience with other large monitors. Typical problems are:

- Obesity from too many rodents and too little exercise. It causes fatty liver and a shorter life. Keep the animal fit with varied food and plenty of space.
- Bite and claw wounds, often after wrong handling or fighting. Clean thoroughly, and see a doctor if a person is bitten and a vet if the animal is injured.
- Bone problems from lack of UVB, calcium and D3.

- Intestinal and blood parasites, especially in wild-caught animals. Have a faecal sample examined when a new animal comes into the home.
- Egg-laying problems in females, for example egg binding, which can be fatal. Give the female a deep egg-laying box, and see a vet if she is bloated and refuses food for a long time.
- Stress and poor sheds from conditions that are too dry or too few hides.

The species has been bred outside Australia since the early 1990s, but how large a share of the animals in the trade are captive bred is not documented. Always ask about origin and papers. See a vet with reptile experience if the animal loses weight, does not eat or has wounds, swelling or breathing problems.

Read more: Common diseases and signs of illness Read more: Buying animals: captive-bred, wild-caught and transport

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.