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MONITOR LIZARDS

## Blue Tree Monitor

# *Varanus macraei*

*Varanus macraei* is a slender tree monitor with a prehensile tail and a pattern of blue eye-spots on a black background. It lives only on the island of Batanta in Indonesia, is threatened in the wild, and needs a tall, warm and humid enclosure, live insects and an experienced keeper.

Family: Varanidae

KEY FACTS

### THE ANIMAL

| | |
|---|---|
| Adult size | **80-110 cm**<br>total length incl. tail |
| Weight | **150-530 g** |
| Lifespan | **8-12 years** |
| Active | **By day** |
| Lifestyle | **Arboreal** |
| Habitat | **Rainforest** |
| Difficulty | **Experienced** |

### CARE

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|---|---|
| Min. enclosure | **120 × 80 × 150 cm**<br>L × W × H for 1 adult |
| Temperature, day | **29-32 °C** |
| Basking spot | **38-40 °C** |
| Temperature, night | **22-25 °C** |
| Humidity | **70-90%** |
| Water | **Water dish** |
| UVB | **Recommended**<br>Ferguson zone 2 |
| Diet | **Insects, vertebrates and worms/snails** |
| Kept | **Singly or in pairs** |

### BREEDING

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|---|---|
| Reproduction | **Egg-laying** |
| Sexually mature | **24-26 months** |
| Clutch size | **2-7 eggs** |
| Clutches per year | **1-4** |
| Incubation | **150-240 days**<br>at 28.5-31 °C |

### PROTECTION AND PAPERWORK

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| CITES | **Appendix II** |
| EU annex | **Annex B** |
| IUCN | **Endangered (EN)** |

## About the species

*Varanus macraei* is a slender, diurnal tree monitor in the group that also includes *V. prasinus* and *V. beccarii*. The species was described in 2001 by Böhme and Jacobs from animals in the trade and is named after Duncan MacRae, who founded the reptile park Rimba on Bali. The back is black with slanting, irregular rows of blue eye-spots, and the tail has alternating blue and black bands. The tail is round in cross-section and can grip branches. The prehensile tail, the smooth nuchal scales without keels and the blue markings together set the species apart from the other tree monitors.

Adults reach a total length of up to about 110 cm, but most are 80-95 cm. The snout-vent length is at most 36 cm in males and 31 cm in females. About two thirds of the length is tail. Adults typically weigh 150-530 g, males most.

Males have a larger head and a distinct swelling at the base of the tail. Young and newly imported animals are shy and nervous, and females seem more timid than males. Each individual can be recognised by the pattern of spots on the neck, so photographs of each animal make a useful record.

The species is a long-term commitment, but not in the way large monitors are. It does not need a whole room, but a tall enclosure with good ventilation, a daily routine of misting and lighting, live food several times a week and stable warmth. The cost of food is modest; the real price is the time and the knowledge of the species. The lifespan in captivity is not known; the figure in the fact box is an estimate based on other tree monitors of the same size.

The animals are expensive and typically cost 800-1,000 euros each in Europe. The species has been bred both in zoos and privately, but experience with captive breeding is still limited.

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

## Distribution and habitat

*Varanus macraei* is found only on Batanta, an island of about 455 km² in Raja Ampat, north-west of the Bird's Head Peninsula of New Guinea (Indonesia), and possibly on a few small islands just off the coast. The island is at most 61 km long and 13 km wide, so the species has one of the smallest ranges of all monitors. The population has not been counted. The species is rarely seen in the wild, and on a small island off the village of Mandui it is almost extinct because of collecting for the pet trade. Animals seen outside Batanta come from the trade and are not part of the natural range.

> **Native range:** Indonesia.

### HABITAT

The species is a dedicated tree dweller in dense, humid tropical forest on the steep slopes of Batanta. It lives in the canopy and is rarely seen below 50 m above sea level. When frightened, it flees from tree to tree or jumps or falls to the forest floor. The animals are active in the morning from about 9-10 o'clock and withdraw around 13 o'clock, when it is hottest.

The temperature is even throughout the year: down to 22 °C at night, about 24 °C at sunrise and 35 °C in the shade in the middle of the day (maximum 37 °C). The food in the wild is probably insects, especially grasshoppers. Rainfall is lower from October to March, and most eggs in captivity are laid in exactly that period.

## Care

### THE ENCLOSURE

*Varanus macraei* is a tree monitor, and the enclosure must therefore above all be tall. For one adult the minimum is 120 × 80 × 150 cm (length × width × height), and more is better. A pair needs at least 100 × 100 × 150 cm. The dimensions are a minimum, not an ideal. The enclosure should not be glass all the way round, because the animals are nervous and can crash into the panes and injure their snouts. Use panels on the sides and back wall and a glass door at the front, so that the animal sees an enclosed space with hides.

Fill the enclosure with sturdy branches of different thickness, so that the tail can grip them, as well as cork tubes, shelves and live plants (for example *Ficus*) as hides and climbing routes. Keep the climbing surfaces close to the warm spots. Damp bark chips or a mixture of coconut fibre and potting soil, at least 10 cm deep, which holds moisture, suit as substrate.

For egg-laying, place a wooden box of about 25 × 25 × 30 cm with an entrance hole 6 cm in diameter high up in the enclosure. Fill it with damp sphagnum, sand and leaf litter in equal parts or with a 5-6 cm layer of peat. Lamps and heat sources must be shielded, so that the animal cannot burn itself on them. Doors must close fully, because the animals are fast and can jump.

Juveniles of 10-15 g can live in an enclosure of about 85 × 60 × 60 cm for the first months, but must move fairly quickly to taller enclosures and be separated individually when they become unequal in size. A quiet place above eye level, where there is not much traffic, makes the animals less stressed.

### TEMPERATURE

The daytime temperature in the enclosure is kept at 29-32 °C. Under the heat lamps there must be a basking spot of about 38-40 °C surface temperature (measured with an IR thermometer), and the rest of the enclosure must be cooler, so that the animal can choose between warmer and cooler places. The night must be cooler, 22-25 °C, as in the wild. Use a thermostat for all heat sources.

An animal that seeks to get away from the basking spot all day is too warm. An animal that hides, does not bask and eats poorly is probably too cold. The species does not need a winter rest, but a slight cooling at night is natural. The figures suit both the climate on Batanta and breeding in captivity.

Read more: Heat and temperature

### HUMIDITY AND WATER

Humidity is kept at 70-90 % with daily misting, preferably morning and afternoon. Humidity must drop a little between mistings, so that plants and branches can dry, and ventilation must be good, so that mould and respiratory problems do not develop. A water bowl of about 50 × 25 cm or larger stands on the floor and is used for drinking, but the animal drinks mostly from water droplets on leaves and branches. Keep the bowl and the substrate clean.

Chronically low humidity can lead to dehydration and kidney problems.

Read more: Humidity, misting and ventilation

### LIGHTING AND UVB

The species is diurnal and needs strong light and UVB all day. Use, for example, two fluorescent tubes (about 54 W) and two 100 W heat lamps that also give UV light, or a UVB tube combined with a UV heat lamp. Zone 2 suits diurnal forest-dwelling monitors, and the animal must always be able to choose shade. Replace tubes according to the manufacturer's instructions, because the UVB output falls long before the light goes out.

The day length is about 13 hours of light and 11 hours of darkness. Some lamps can be switched off by a timer for periods during the day to resemble clouds.

Read more: Lighting and UVB

### FEEDING

*Varanus macraei* eats live insects: grasshoppers, crickets, cockroaches (e.g. *Blaptica dubia*), mealworms and superworms, and occasionally earthworms. Adults are given insects two to five times a week, and the food is dusted with calcium or a vitamin and mineral supplement, preferably alternating from meal to meal.

Vertebrates can be given as a supplement at most once a week: newborn to two-week-old mice, and now and then a piece of chicken or fish. Rodents should not be the main food, because the species easily becomes fat, and in the wild the food is invertebrates. Young animals are given small grasshoppers a few days after hatching and eat daily or every other day. Some hatchlings develop a preference for mice or grasshoppers, so it is an advantage to vary the diet from the beginning.

Young animals are sensitive to stress. If they stop eating and lose weight to below 9 g, it can be fatal. Keep them quietly, and weigh them regularly.

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

### BEHAVIOUR AND HANDLING

The species is diurnal, shy and nervous. New animals hide or flee when touched and can crash into the panes. Females are more timid than males. The animal should not be forced to be handled. Proceed calmly and slowly, offer food from tweezers, and let the animal get used to you before you touch it. If it is held tightly or frightened, it can bite and scratch. The claws are sharp, and a bite from an animal of 150-530 g rarely causes serious injury, but can cause deep lacerations. It is better to let the animal climb onto a hand or an arm than to grab it.

All monitors can carry salmonella, so hands must be washed thoroughly after any contact with the animal, the enclosure or the food. Children and people with weakened immune systems should not have contact.

The species is kept singly or in pairs. The female can become aggressive towards the male when she is gravid or has laid eggs, and the male may need to be separated for a period. There is no experience with keeping in groups.

Read more: Quarantine and hygiene

## Breeding

### SEXUAL MATURITY AND SEXING

Males have a larger head and a distinct swelling at the base of the tail and reach a snout-vent length of up to 36 cm, females up to 31 cm. Males can be recognised even as young, females only reliably after about a year. The sex is determined by probing and palpation, and occasionally males evert the hemipenes. The spur-like scales behind the vent are not reliable and give the wrong sex in about 3 of 10 animals. Endoscopy of the cloaca is reliable, but requires light anaesthesia.

The species becomes sexually mature at about two years of age, and males can mate successfully at 26 months old. At 17 months the animals weigh 150-180 g and are not yet fully grown.

### MATING

The mating season runs from November to May, mostly from November to January. The female approaches the male, and the pair rest close together. Mating takes place horizontally on a branch or a cork tube and lasts at least 5-6 minutes. About three weeks after the first mating attempts the male should be removed, as the female becomes aggressive; he is put back two weeks after she has laid eggs. When she is gravid she basks a lot and moves restlessly, and a few days before egg laying she will not eat.

A cool period is not necessary.

### EGG-LAYING AND CLUTCHES

2-7 eggs are laid per clutch, on average about 4. Between mating and egg laying there are 5-7 weeks. Up to four clutches can be laid per year, and at least about 95 days pass between two clutches from the same female. Most clutches (almost 65 %) are laid from October to March. The eggs are 43-55 mm long and 18-25 mm wide and weigh 9-18 g. The female lays them in a laying box with moist substrate; the eggs are not buried but placed on top of it. Eggs that are not removed from the parents are sometimes eaten.

### INCUBATION

The eggs are carefully removed and placed on moist vermiculite, or vermiculite and sand in a ratio of 2:1, in closed plastic boxes with two eggs in each. They are not turned. The humidity in the box is about 97 %. The incubation temperature is 28.5-31 °C, and below 28 °C the embryos die. The length of incubation depends on the temperature: about 150-155 days at 30-31 °C, 154-158 days at 29.3 °C and 169-240 days at 28.5 °C. The temperature does not appear to determine the sex of the hatchlings.

A few days before hatching the shell develops a red marbling and small bumps, which disappear again shortly before the hatchling breaks out. The hatchlings first push out the snout and can take up to a day to get completely out. If there are signs that a hatchling is struggling, the shell can be opened carefully, but this should only be done with experience.

Read more: Incubating eggs

### REARING THE YOUNG

At hatching the young weigh 10-15 g, have a snout-vent length of 88-100 mm and a total length of 213-264 mm. They eat small grasshoppers a few days after hatching. In the first two months they can be kept together, but must be separated when the differences in size grow. After 17 months they weigh 150-180 g and are 67-71 cm long. The young are sensitive to stress: stress leads to refusal of food and weight loss, and a weight below 9 g is probably fatal. Give them a quiet spot, plenty of hiding places, high humidity and light in the enclosure, and weigh them regularly. The pattern on the neck can be used to tell each individual apart.

## Health and common mistakes

The most frequent problems are caused by stress, wrong heat, lighting and nutrition, and by injuries.

- Snout injuries and deformities: nervous animals can crash into glass panes. Use closed sides and hiding places.
- Lack of calcium, D3 and UVB: can lead to bone disease with weak bones, fractures and growth disorders, especially in young animals. The calcium level in the blood should be measured at a vet visit.
- Obesity: a risk if the animal is given too many mice and too little climbing.
- Dehydration and gout: in monitors gout most often arises from chronic dehydration. Keep the humidity up, and provide water.
- Egg-laying problems: females that do not lay need a vet.
- Weight loss in hatchlings: an animal that loses weight to below 9 g is in danger of dying.

Animals in the trade are almost all wild-caught and can have intestinal worms and other parasites, and be stressed and emaciated on arrival. Have a faecal sample examined by a vet who specialises in reptiles, and keep newly acquired animals separate and quiet for the first weeks. Captive-bred young are better off, but are rare. Contact a vet if the animal refuses food for more than a few days, if it loses weight, if there are swellings or if the animal lies still on the floor.

In the trade the species is rarely captive bred. By far the majority of the animals traded internationally are taken from the wild on Batanta, even though a proportion are labelled as captive bred or farmed. Less than 1 % of the total trade is captive-bred animals. This means that every animal purchased puts pressure on a small and vulnerable population, and it is a reason to choose captive-bred animals where they are available.

### 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.