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MONITOR LIZARDS

Solomon Island spiny monitor

Varanus spinulosus

Varanus spinulosus is a rare and almost unknown monitor from the Solomon Islands and Bougainville, recognisable by its sandpaper-like, spiny scale texture and rows of large yellow spots on a dark ground. Its care is based on related species, because there is almost no experience with it in captivity.

Family: Varanidae Former name: *Varanus indicus spinulosus*

KEY FACTS

THE ANIMAL

Adult size	**90-100 cm** total length incl. tail
Lifespan	**10-15 years**
Active	**By day**
Lifestyle	**Arboreal and terrestrial**
Habitat	**Rainforest and wetland**
Difficulty	**Expert**

CARE

Min. enclosure	**300 × 120 × 200 cm** L × W × H for 1 adult
Temperature, day	**27-30 °C**
Basking spot	**40-48 °C**
Temperature, night	**24-25 °C**
Humidity	**60-90%**
Water	**Water section** depth 10-40 cm
Water temperature	**26-29 °C**
UVB	**Essential** Ferguson zone 3
Diet	**Insects and vertebrates**
Kept	**Singly**

BREEDING

Reproduction	**Egg-laying**
Clutch size	**4-7 eggs**
Incubation	**150-195 days** at 28-30 °C

PROTECTION AND PAPERWORK

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

About the species

Varanus spinulosus is a medium-sized, heavily built monitor with a dark ground colour and three to four transverse rows of large yellow spots. The front rows often merge into broad bands. The species is the only monitor with strongly cone-shaped, keeled scales, and the skin feels like sandpaper. This is also the source of the scientific name, which means "spiny". The skin sits loosely on living animals in the wild. The eyes are relatively large, and the claws are not as sharp as in the tree-climbing relatives, which suggests a more ground-dwelling life.

The species was described in 1941 by Robert Mertens from a single animal and was regarded as a subspecies of *V. indicus*. For many years only two museum specimens with a precise locality were known, and it was not until the early 1990s that five animals with imprecise localities came from Isabel to the USA. More recent studies of the hemipenis and scales show that the species does not belong to the group in which it was placed. Today it stands in its own subgroup, *Solomonsaurus*, and is one of the least known monitors.

The species grows to about 90-100 cm in total length. Snout-vent length, weight, lifespan and sex differences are not known, and the lifespan in the fact box is borrowed from related monitors of the same size.

In practice there is no experience in keeping the species: in 2016 there were only two animals in zoos worldwide, both of unknown sex. The care advice is therefore borrowed from *V. juxtindicus* from Rennell Island in the Solomon Islands and from species in the *V. indicus* group. This is not an animal to experiment with.

As an adult it needs a whole room or a large, custom-built enclosure, powerful heat and UVB every day, a continuing expense for fish, eggs, insects and whole food animals and many years of daily time. Breeding is not documented, so animals that come into the trade must be expected to be wild-caught and may carry intestinal worms. A vet with experience of monitors is a prerequisite.

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

Distribution and habitat

Varanus spinulosus is found only in the Solomon Islands and on Bougainville in Papua New Guinea. There are reliable records from Isabel, from the San Jorge Islands (where the type specimen was collected) and from Bougainville, where a museum specimen comes from Cape Torokina.

Reports from the Louisiade Islands and a photo from Charapoana Island have been rejected as errors or invalid records. Occurrence on Choiseul is probable, because the islands were connected in the Ice Age, but is not documented. How many animals exist is unknown. On the IUCN Red List the species is listed as Least Concern (LC), but the assessment is based on very few data.

> **Native range:** Solomon Islands and Papua New Guinea.

HABITAT

The habitat is poorly known. On Isabel the species lives in coconut groves along the coast, a few metres from the high-water mark and close to villages, with sea-level rainforest behind them where sago palms and wild betel palms grow. It is active in full sun in the middle of the day and is also common in sago palm plantations.

The species moves about on the ground but runs up palm trunks and hides in the crowns when disturbed. It also lives in mangrove. The climate is warm and humid all year round. The species copes in disturbed cultivated land and near people, even where the introduced toad *Rhinella marina* is very common.

An important point for care is that the species is diurnal and spends the day in direct sun. It needs a microclimate with very hot basking spots and humid hides at the same time.

Care

THE ENCLOSURE

The dimensions are borrowed from related monitors about 100-140 cm long. An adult *Varanus spinulosus* needs a home-built enclosure or a whole room of at least 300 × 120 × 200 cm (length × width × height). Keep the animal singly until there is experience.

Standard enclosures of glass and silicone do not withstand an animal of this size, strength and activity. Use a light but robust construction of, for example, lightweight concrete and aluminium profiles with rendered, waterproof walls. Glass doors must be lockable, and sliding doors are unsuitable. The more openings, the easier it is to work inside the enclosure.

Furnish with sturdy branches and an artificial rock wall at the back so the animal can climb. The species lives both on the ground and in palm crowns, so there must be both floor space and climbing opportunities. Build a permanent water section at the bottom, for example 190 × 100 cm and 40 cm deep for an adult. Related species use the water to swim and dive in and even to sleep in, so the water temperature must not drop at night.

Use a 20 cm layer of damp bark mulch as substrate so a female can dig her nesting site. Juveniles are first housed in a small plastic box of about 45 × 25 × 30 cm with paper as substrate and a shallow water dish, and then moved to a glass enclosure of about 130 × 70 × 90 cm with a water tray 10 cm deep. All heat sources and cables must be out of the animal's reach or shielded with mesh, because the animals are strong and use every corner of the enclosure.

TEMPERATURE

The temperatures for *Varanus spinulosus* are borrowed from *V. juxtindicus* and other species in the *V. indicus* group. The air temperature is kept at 27-30 °C by day and 24-25 °C at night, and the water at 26-29 °C.

There must be a warm area with a basking spot of 40-48 °C. This is surface temperature, which must be measured with an infrared thermometer directly at the place where the animal lies, not the air temperature. 40-45 °C is a safe starting point, e.g. under a spot of about 120 W. There must be a large temperature gradient, so that the animal can freely choose between warm and cooler zones.

The heat sources must sit out of the animal's reach, and the thermostat probe must be inaccessible, because the animals are so strong. The species comes from a near-equatorial climate, so there must be no cool period or brumation.

Read more: Heat and temperature Read more: Brumation and the seasons

HUMIDITY AND WATER

The humidity must be 60-80 % by day and higher at night, up to 90 %. This is achieved with a large water area, moist substrate and daily spraying. Still air causes mould and bacterial growth, so ventilation must be good.

In the wild the species lives on the coast, where the humidity is high all year. The water must be changed often, because animals of this type also defecate in it. A water area with a drain that can be emptied without opening the terrarium makes the work much easier. Also spray the substrate regularly, so that one end of the terrarium retains moisture.

Read more: Humidity, misting and ventilation

WATER AND WATER QUALITY

Its relatives in the *V. indicus* group swim and dive frequently and sleep in the water, so a permanent water section is recommended, even though the species is not known to be semi-aquatic. An adult needs a pool of about 190 × 100 cm and 40 cm deep; juveniles about 10 cm depth.

The water is kept at 26-29 °C and may fall only slightly at night, because related animals sleep in it. Filter and heat it, and change it often. A drain directly to the sewer makes water changes easier. Make sure the animal can always easily get out of the water.

LIGHTING AND UVB

The species is diurnal and basks in full sun in the middle of the day, so as an adult it needs strong light and UVB. Use e.g. four 36 W fluorescent tubes and a 120 W spot that are on all day, and a 300 W UV spot that is switched on for 45 minutes in the morning and in the afternoon, or equivalent LED lighting with 80 W basking spots and 70 W UV lamps.

Provide UVB in Ferguson zone 3, and place the lamp so that the animal can get close and also seek shade. Related species stay for a long time under the light source. Use a UV meter and replace bulbs according to the manufacturer's instructions, because UVB declines with time.

FEEDING

In the wild the species eats arthropods, megapode eggs, fish and small birds. It comes out of the forest to take the entrails of cleaned fish, raids henhouses and forages in the tidal zone. The species is a versatile, partly scavenging hunter.

Like related species, adults get large insects plus half-grown mice and rats, boiled eggs, crabs and saltwater fish two to three times a week. Juveniles are fed daily for the first four months and then four days a week with large locusts, crickets, mealworms and pinkie mice. Keep obesity and fatty liver in check: rodents should not be the staple, but a variety with fish and insects.

Give a vitamin and mineral supplement with all food items. Dose the supplement per kg of body weight per week, with D3 as the key element, even with daily UVB. Agree the dose with a vet.

Feeding is dangerous. Related animals throw themselves quickly at the food and bite uncontrollably all around. Wash your hands before feeding, so that the smell of eggs, fish and mice is not on them, and use long tweezers. The animals should be separated during feeding.

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

BEHAVIOUR AND HANDLING

The species is shy in the wild and flees up into palm crowns. A captured animal may hiss and still calm down quickly without trying to bite, but nothing more is known about its temperament. The claws are less sharp than in many other monitors, but an animal of 90-100 cm has a powerful bite and a tail that can lash, so serious injuries are a real risk.

Wait to handle a new animal until it has settled in. Approach the animal calmly and slowly, support the whole body and do not grab the tail. Tame by spending time in the room and being predictable. Learn to read stress: hissing, an inflated throat and a lashing tail, and stop handling when they are seen.

As with all reptiles, the animal can carry salmonella. Wash your hands with soap after any contact with the animal, the enclosure and the water, and do not use kitchen sinks for cleaning. Small children and pregnant women should keep their distance.

Related species are surprisingly sociable, and two males can live together with a female for a long time without conflict, but juveniles can injure each other seriously. Keep *Varanus spinulosus* singly until there is experience.

Read more: Quarantine and hygiene

Breeding

SEXUAL MATURITY AND SEXING

Sex differences and age at sexual maturity are not known for *Varanus spinulosus*, and there are no known external features. A male can, however, partly evert its hemipenes when caught. In monitors generally, reliable sexing of young animals requires a vet. Breeding animals of related species measure about 100-140 cm.

MATING

Mating has not been described for *Varanus spinulosus*. In related species the male bites the female hard on the neck during courtship, and mating can follow after two months together. A female can be kept with two males in the same enclosure without conflict. Give the female a separate enclosure for gravidity and egg-laying.

EGG-LAYING AND CLUTCHES

The species lays eggs, but clutches have not been described. The 4-7 eggs in the fact box are borrowed from *V. juxtindicus*, where the female lays about 40 days after the last mating. Give her a buried laying box with a removable lid. Eggs of *V. rainerguentheri* are about 70 mm long. Termite mounds up in the palms may be a natural laying site, but this is not documented.

Females of the related species eat a large part of the eggs right after laying, up to half, even after hormone treatment. Expect this, and guard the box.

INCUBATION

Incubation has not been described for *Varanus spinulosus*. In *V. indicus* and *V. juxtindicus* the eggs are incubated at 28.5-30 °C and hatch after 158-174 days; at lower or fluctuating temperatures it can take up to 193 days. Do not turn the eggs, and bury them halfway in vermiculite, perlite or bark mulch in a box.

The young open the eggs themselves, and the navel closes after 1-2 days. The fertilisation rate is low, about one egg in five, but most fertilised eggs hatch.

Read more: Incubating eggs

REARING THE YOUNG

Rearing of *Varanus spinulosus* is borrowed from *V. juxtindicus*. The young weigh about 23 g at hatching and start eating after 3-4 days. The first shed comes after 33-46 days and then after about 4, 6 and 12 months. In *V. rainerguentheri* the young measure about 27 cm in total length at hatching and 85 cm after 18 months.

Before the first meals they are kept apart on damp paper. Give larger insects, pieces of fish and pinkie mice; mice are clearly preferred. Feed daily for the first four months and then four days a week. Give vitamins and minerals. Juveniles can seriously injure each other, so feed them separately if there are signs of squabbling.

Health and common mistakes

There is no specific disease knowledge about the species. The following is based on related species and monitors in general:

- Intestinal worms and protozoa in newly imported, wild-caught animals. Typical signs and findings are thin, bloody faeces, worms, tapeworms, flagellates, amoebae and lungworms. It can be fatal and spreads easily. Have faecal samples analysed, and treat at a vet.
- Quarantine for at least eight weeks for new animals, with separate equipment and newspaper as the bottom. Wash and disinfect hands and tools.
- Animals caught in the wild and kept in poor conditions are stressed and tolerate transport poorly.
- Salmonella can be transmitted. Keep good hand hygiene.
- Weakened bones from too little UVB, vitamin D3 or calcium.
- Obesity and fatty liver from too much fat, especially if rodents are the main food.
- Wounds and injuries from fights and feeding bites.
- Skin problems from a constantly wet substrate without dry areas.

With few animals in the whole world, there are many unknowns. See a vet with experience of monitors in case of weight loss, lack of appetite for several weeks, swellings, lethargy or bloody faeces. Breeding is not documented, so animals in the trade must be expected to be wild-caught and should be treated as potentially sick from the start.

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.