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TORTOISES AND TURTLES

Impressed Tortoise

Manouria impressa

Manouria impressa is a rare, shy tortoise from the cool, rain-soaked bamboo and evergreen mountain forests of South-East Asia. It lives almost entirely on fungi and spends most of its time hidden in the leaf litter. It is among the most difficult tortoises to keep and requires a lot of space, constant humidity and a cool climate.

Family: Testudinidae Former name: *Geoemyda impressa*

KEY FACTS

THE ANIMAL

Adult size	**25-31 cm** total length incl. tail
Lifespan	**20-40 years**
Active	**At dusk**
Lifestyle	**Terrestrial**
Habitat	**Montane forest**
Difficulty	**Expert**

CARE

Min. enclosure	**150 × 150 × 60 cm** L × W × H for 1 adult
Temperature, day	**21-27 °C**
Temperature, night	**12-18 °C**
Humidity	**70-100%**
Water	**Water section**
UVB	**Recommended** Ferguson zone 1
Diet	**Complete diet and plants**
Kept	**Singly, in pairs or one male with several females**

BREEDING

Reproduction	**Egg-laying**
Clutch size	**10-20 eggs**
Incubation	**64-79 days** at 26.6-30 °C

PROTECTION AND PAPERWORK

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

About the species

Manouria impressa is a medium-sized tortoise with a flattened, yellowish brown to brown carapace whose central scutes are slightly sunken; hence the species name *impressa*, "impressed". The shell grows up to 31 cm long, and the margin is strongly serrated all the way round. The head is yellow to light brown, the forelegs are black, and the hind legs and tail are dark brown. Males have longer and thicker tails than females, and the tail can end in a pointed horny scale.

The species was described in 1882 as *Geoemyda impressa* from an animal from Siam. Together with *Manouria emys* it belongs to the genus *Manouria*, which is regarded as one of the most primitive among living tortoises. Unlike *M. emys*, *M. impressa* grows considerably smaller and is far more particular about food and climate. Lifespan is not documented; 20-40 years in captivity is an estimate.

In the wild it is hard to find. It is most active at dusk and during rain showers, and spends most of its time buried in the leaf litter. The young are yellowish brown and about 44-50 mm long at hatching. The species feeds on fungi and is difficult to keep and even harder to breed in captivity. Many wild-caught animals come from the live-animal trade to food markets and have been badly treated before they reach a keeper.

The IUCN assesses the species as endangered (EN). It is under pressure from collection for food and medicine markets and from forest loss to agriculture and forest fires. Breeding rarely succeeds, and few captive-bred animals exist.

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

Distribution and habitat

Manouria impressa lives in the mountain regions of South-East Asia: in Thailand, Myanmar (from the Karenni Hills southwards), Laos, Cambodia, Vietnam and Malaysia on the Malay Peninsula. It has also been found in north-eastern India (Arunachal Pradesh) and in Yunnan and Hunan in China. The record from Hunan is probably due to an introduced animal, and the species has been introduced to Hainan.

The range is large but very patchy: the species occurs only locally in mountainous forest areas. The type locality is Siam, present-day Thailand.

> **Native range:** Thailand, Myanmar (Burma), Laos, Cambodia, Vietnam, Malaysia, India and China.

HABITAT

Manouria impressa lives in dense evergreen forest and bamboo thickets on mountains and ridges, normally above about 700 m. The area receives rain almost every day, and the forest floor stays damp even in the drier part of the year. Humidity is 70-100% and rarely drops below 65%.

The temperature in the habitat is typically 21-27 °C by day and 10-18 °C at night. The forest is dark and shady, and the tortoise does not bask in open sunlight. It lies hidden under fallen trees, in bamboo stems and buried in the leaf litter, and it gets its water from dew and rain-soaked vegetation.

The mating season falls in the wet season, and the female covers the eggs with leaves. The diet is almost entirely fungi, especially *Pleurotus* (oyster mushrooms), *Amanita*, *Auricularia* (wood ear) and *Termitomyces*, and to a lesser extent young bamboo shoots and low vegetation. The diet is so narrow that the species is difficult to keep alive in captivity.

Read more: Humidity, misting and ventilation

Care

THE ENCLOSURE

Manouria impressa is very demanding, but does well when its requirements for climate, humidity and food are met. If you are inexperienced with tortoises, the species is not a good choice.

The best solution is a large outdoor enclosure or a greenhouse with dense planting, trees or bamboo for shade and a thick layer of leaves, so that the animal can dig in and build a nest. A pair needs at least 45 m², and a breeding group of one male and three females is kept on more than 90 m². If the temperature falls below 10 °C at night, the animals must come indoors. In a cool, temperate climate this happens for much of the year, so a heated greenhouse or an indoor facility is necessary.

Indoors, an adult needs at least 150 × 150 cm (2.25 m²) with a height of 60 cm. Indoors, adults are kept singly, because this reduces stress when the animals would otherwise be close together.

The substrate is a thick, damp mix of bark mulch or sphagnum with a deep layer of leaves, so that the tortoise can hide completely. Provide several hiding places of tubes, pieces of bark and fallen branches, and add leaves several times a year. A shallow, wide water bowl or a shallow pond is necessary, because captive animals often lie in water. Young animals are kept on damp sphagnum with leaves and a small hide in a closed but ventilated box.

TEMPERATURE

By day the temperature should be 21-27 °C, and at night 12-18 °C. The species is adapted to a cool mountain climate and does not need a heat lamp or a basking spot. Instead, offer shade all day and a slight temperature difference between areas of the enclosure, so that the tortoise can choose for itself. The night temperature must not fall below 10 °C.

The figures match the climate of the species' habitat. The greatest risk is the switch between outdoor and indoor facilities in autumn, which is the time when most animals fall ill.

Read more: Heat and temperature

HUMIDITY AND WATER

Humidity should be 70-100% and never below 65%. It is the single most important factor in care, and dehydration is a frequent cause of loss of appetite and illness.

Mist the enclosure every day for about an hour, preferably with mister nozzles placed about one and a half metres apart around the edge. At least twice a week a sprinkler can give plants and leaves a heavy soaking. Indoors, mist the enclosure daily, and bathe the animal every other day in a box with a drain under a fine spray for about an hour. Most animals begin to drink when they get this kind of water.

The animals rarely drink from a bowl, but a shallow bowl of clean water should still be provided. For young animals, misting during feeding stimulates the appetite of fussy eaters.

LIGHTING AND UVB

The tortoise lives in deep shade and does not bask in the wild. Even so, animals kept indoors need UV light from a quality tube during the daytime. Choose a weak UVB source for shade-dwelling animals (Ferguson zone 1), and leave a large part of the enclosure in shade. The zone is an estimate based on the species' way of life.

Use daylight of about 12 hours a day and a timer. Outdoors or in a greenhouse, the planting must provide dense shade, and the animals must be able to dig in to get away from the light.

Read more: Lighting and UVB

FEEDING

Manouria impressa is a fungus eater: in the wild the diet consists almost solely of fungi, and fungi are also the main food in captivity. Oyster mushrooms are easy to obtain, well accepted and high in calcium, which is an advantage for females that have to lay eggs. Use cultivated, edible mushrooms; wild mushrooms are not a good idea, because many are poisonous.

Twice a week the animal is given a salad in which the mushrooms are mixed with greens and vegetables such as pak choi, cabbage, yellow squash, courgette, sweet potato and carrot. Between salad days, mushrooms alone are given once or twice a week. Moistened tortoise pellets can be mixed into the salad and give faster growth. Some stubborn eaters also show interest in fruit and flowers.

Young animals are given a finely chopped version of the adult diet. Give them a supplement of calcium and vitamins in the food. Portion size is not documented, so weigh the animals once a week and adjust the amount according to weight. Many animals are stubborn eaters, and some refuse to accept anything but one kind of mushroom.

Read more: Calcium, vitamins and supplements

BEHAVIOUR AND HANDLING

Manouria impressa is shy and hides most of the time in the leaves, often with only the head showing. It is most active at dusk and after rain. It should be handled only when necessary, for example for weighing.

Young animals can be kept in small groups of two or three if all are gaining weight. If a young animal loses weight, this usually indicates too many animals in too little space, and the animal must be moved. Adults are kept singly outside the breeding season, because this reduces stress. A breeding group of one male and three females can be kept together if there is over 90 m² and many hiding places and trees for shade.

Many illnesses in the species are caused by stress, and they are often discovered too late because the animal lies hidden in the leaves. Weigh the animal regularly and keep records.

Breeding

SEXUAL MATURITY AND SEXING

Males have longer and thicker tails than females. On the underside of the tail, the male's scales lie in pairs and regularly meet in the midline, while in the female they are staggered and form a zigzag line. Age and size at sexual maturity are not documented. Breeding requires a large facility and animals in good condition, so breeding belongs only with experienced keepers.

MATING

Mating begins in early spring and continues throughout the summer; in the wild, courtship is seen from mid-March to September, in the wet season. The male approaches the female from the front, nods his head and opens and closes his mouth. If the female is receptive, she raises her body high, and the male mounts her from behind. During mating he stretches his neck and makes sounds, but he does not bite or butt the female.

A breeding group of one male and three females can work well in a large facility with many trees and plenty of shade and hiding places. Outside the season the animals are kept singly.

EGG-LAYING AND CLUTCHES

The eggs are typically laid in June and July. The female builds a large nest of leaves by walking in ever larger circles and drawing leaves together into a dense, woven mound, often against a wall or fence. The mound can be up to 1 m high. She digs a nest hole in the middle, 30-35 cm deep, and lays 10-20 hard-shelled eggs the size of a table tennis ball. She then covers them in the same way with leaves and twigs, so that the eggs lie up to 35 cm down.

Give the female plenty of leaves, twigs and space along a wall or fence. How many times the female lays per year is not documented.

INCUBATION

The eggs can be removed from the nest and placed in moistened vermiculite, mixed 1:1 by weight with water. The species has temperature-dependent sex: at 28.8-30 °C females hatch, and at 26.6 °C males hatch. At these temperatures the eggs hatch after 64-79 days. Humidity around the eggs should be about 80%.

Breeding rarely succeeds, and hatchings remain something special.

REARING THE YOUNG

The young weigh about 16 g and are 44-50 mm long at hatching. Keep them in moistened sphagnum with leaves and a small hide, and with a shallow dish where they can bathe, which they often do in captivity. Mist daily.

Give the young a finely chopped version of the adult diet with moistened pellets and calcium. Small groups of two or three animals can be kept together if all gain weight every week. Weigh them every week, and move the animals that lose weight to separate quarters. The smaller animals usually carry on growing once they are separated from the others. Misting while they eat can help young that are hard to get to feed.

Health and common mistakes

Manouria impressa is vulnerable, and most problems are caused by stress, dehydration or the wrong climate. The typical problems are:

- Dehydration, which causes loss of appetite and other problems. Mist daily and bathe the animal.
- The switch between outdoor and indoor facilities in autumn, which is the time when most animals fall ill. Stress is an important trigger.
- Intestinal worms, especially amoebae, in adult animals. The disease can progress quickly after the first signs, which are lethargy and weight loss.
- Stones and other indigestible items in the stomach. This is a common problem in adult animals taken from the wild and passed through the trade to food markets, and they may require an operation.
- Fussiness: many animals refuse to eat anything but fungi. Weight loss is the first sign.

The animal lies hidden in the leaves, so illness is discovered late. Weigh the animal every week and keep records. See a vet with experience of tortoises in case of weight loss, lethargy or loss of appetite.

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.