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TORTOISES AND TURTLES

Forsten's Tortoise

Indotestudo forstenii

Indotestudo forstenii is a medium-sized tortoise from the forests of Sulawesi and Halmahera in Indonesia. The carapace is caramel to dark brown with black blotches, and adults typically reach about 25 cm. The species is crepuscular and shy, needs warmth and high humidity, and does not hibernate. It is critically endangered, and animals taken from the wild are often sick.

Family: Testudinidae Former name: *Testudo forstenii; Geochelone forsteni; Indotestudo elongata forsteni*

KEY FACTS

THE ANIMAL

Adult size	**25-30 cm** total length incl. tail
Weight	**2,000-3,000 g**
Lifespan	**30-50 years**
Active	**At dusk**
Lifestyle	**Terrestrial**
Habitat	**Rainforest**
Difficulty	**Experienced**

CARE

Min. enclosure	**180 × 120 × 40 cm** L × W × H for 2 adults
Temperature, day	**26-30 °C**
Basking spot	**30-32 °C**
Temperature, night	**18-20 °C**
Humidity	**70-85%**
Water	**Water dish**
UVB	**Recommended** Ferguson zone 2
Diet	**Fruit, plants and worms/snails**
Kept	**Singly or in pairs**

BREEDING

Reproduction	**Egg-laying**
Clutch size	**1-4 eggs**
Clutches per year	**1-3**
Incubation	**130-165 days** at 26-30 °C

PROTECTION AND PAPERWORK

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

About the species

Indotestudo forstenii is a medium-sized tortoise with an elongated, slightly domed carapace that is flat on top with vertical sides. The rear margin is serrated, most of all in young animals. The base colour is caramel to dark yellowish brown with a black blotch on each scute, but variation is great: some animals are entirely caramel, others almost entirely black. The head is yellowish brown, the skin grey to yellow, and the forelimbs are covered with large scales at the front; the hind legs lack this protection.

All measurements in the text are shell length (carapace). Adults are typically about 25 cm and weigh about 2.5 kg, and the largest reach nearly 30 cm. The female is broader and rounder than the male and has a flat plastron. The male has a longer, thicker tail with a small horny spur at the tip and a slightly concave plastron. The carapace often lacks the nuchal scute, but it can also be well developed. There are two populations on Sulawesi that cannot be distinguished by mitochondrial DNA but look different: the northern animals are larger and lack the nuchal scute, the southern ones are smaller and often have it.

During the breeding season the skin around the nostrils and eyes turns pink in both sexes. The species is shy, tolerates bright light poorly and hides in the middle of the day. It is not an animal to be handled.

Distribution and habitat

Indotestudo forstenii is found on Sulawesi and Halmahera in Indonesia. The type specimen came from Halmahera. On Sulawesi the species has been found in the central and northern parts of the island.

Previously the populations in south-western India were included in the species, and the animals in Indonesia were then thought to have been introduced from India. Today the Indian animals are separated out as *Indotestudo travancorica*, and *I. forstenii* is regarded as a species found only in Indonesia. Older descriptions of the species therefore often concern the Indian animals.

The species is assessed as critically endangered and has declined sharply, first and foremost because it is hunted for food and taken for export, and secondly because of forest loss. Animals in the trade are therefore often wild-caught.

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

> **Native range:** Indonesia.

HABITAT

Indotestudo forstenii is first and foremost a species of humid forest, but it occurs in areas with large climatic differences and therefore also tolerates a drier period. It is crepuscular and comes out in the hours before dawn and after sunset, and the large eyes are adapted to dim light. In the middle of the day it lies hidden.

The diet is fruit, leaves, worms, snails and carrion.

The species is poorly studied in the wild. The closely related *Indotestudo travancorica* lives in humid mountain forest up to 1,000 m, seeks shelter in leaf litter, thickets, hollow tree trunks and rock crevices, and is most active after heavy, warm downpours.

Care

THE ENCLOSURE

Little is known about the care of *Indotestudo forstenii*, and much is borrowed from the close relative *Indotestudo elongata*. The species needs a large, open floor area with damp substrate and hides. Indoors, an open tortoise table works better than a glass vivarium, because the air must be able to circulate. A single adult needs at least 120 × 120 cm, a pair at least 180 × 120 cm, with sides of about 40 cm. The more floor area, the better.

The substrate must retain moisture: cypress mulch or a mixture of sphagnum and cypress mulch is well suited, alternatively unfertilised topsoil mixed with sand. Remove droppings every day, and replace the substrate about once a month. Provide a dark, damp hide at the cool end, for example a box with a dampened sponge in the lid. The animals use it a great deal during the day.

When the night temperature stays above 15 °C, the species does best outdoors in a densely planted enclosure with many shady spots and a shallow puddle with an easy exit. The fence must be opaque, escape-proof and predator-proof, and sheltered from draughts. The animals are active above 20 °C, but must be brought in again when the nights turn colder. In cool climates the season is therefore short. In dry areas, a timed misting system can create the humid climate the species requires. Keep the species apart from other tortoise species.

TEMPERATURE

The air should be 26-30 °C by day and 18-20 °C at night. The animals do not seek the sun and seldom sit under the lamp, but a warm zone of 30-32 °C under a heat lamp at one end, measured at shell height, gives them a choice. Hides are placed at the cool end. A ceramic heat emitter without light or a heat mat under part of the floor can keep up the warmth at night, and everything is controlled by a thermostat.

The species does not hibernate, and the temperature must not fall below 18 °C. In winter the animals are kept indoors and active. The temperatures are borrowed from *Indotestudo elongata* and *Indotestudo travancorica*.

Read more: Heat and temperature

HUMIDITY AND WATER

Humidity should be high, about 70-85 %, with a damper and a drier zone so that the animal can choose. The substrate should be damp but not wet, and the hides are dampened regularly.

There must always be a water dish, large enough for the animal to sit half submerged but shallow enough for it to climb out easily. Plant saucers are well suited for adults. The species often sits in the water in warm weather. Change the water every day. Misting with lukewarm water several times a week brings the animals out and can encourage breeding interest.

Read more: Humidity, misting and ventilation

LIGHTING AND UVB

Indotestudo forstenii avoids bright light, but needs vitamin D3 for calcium metabolism. The best solution is time outdoors in partial shade; glass and acrylic block UVB. Indoors, use a T5 HO tube with a low UVB output (Ferguson zone 2, which suits a shy forest species) over part of the setup, so that the animal can move out of the light. A mercury vapour lamp, which gives both heat and UVB, can also be used.

Provide daylight for about 12 hours a day, and replace the UVB tube according to the manufacturer's instructions, because its output declines long before the tube stops giving light.

Read more: Lighting and UVB Read more: Calcium, vitamins and supplements

FEEDING

Indotestudo forstenii is omnivorous, with plants as the main component. The basis is leaves and herbs such as romaine lettuce, endive, dandelion and plantain together with grated vegetables. Fruit such as apple, pear, melon and banana is included, because fallen fruit makes up a large part of the diet in the wild, but as a smaller part. Offer a varied diet. Newly imported wild-caught animals look for yellow foods such as sweetcorn and squash, and this can be used to get them onto a diet that they can also be given in captivity.

Animal protein is given sparingly: earthworms and snails regularly, and a thawed pinkie mouse or a little soaked, lean cat food at most twice a month. Meat is not part of the daily diet. Adults are fed every third day and juveniles every other day, as with *Indotestudo elongata*.

Dust the food with calcium once a week, with D3 when the animal is kept indoors and without D3 outdoors. Always keep a cuttlebone available so that the beak is worn down properly. Ivermectin must never be used on tortoises, because it is fatal to them.

BEHAVIOUR AND HANDLING

Indotestudo forstenii is shy and most active at dawn and dusk. It needs several hides and must not be disturbed all the time. Lift it only when necessary, under the plastron with both hands.

Males are aggressive in the breeding season: they ram and bite the female on the head, neck and forelimbs and can injure her if the area is too small. Keep only one male per enclosure, as males also fight among themselves. Some large females are so dominant that they keep smaller males down. The male is noisy during mating, with a hoarse, rasping sound.

Breeding

SEXUAL MATURITY AND SEXING

The male has a longer, thicker tail and a slightly concave plastron; the female is broader and has a flat plastron. Age and size at sexual maturity are not documented for the species.

MATING

Mating is triggered by rain and is violent, so there must be a large area and many hides, and the female must be able to get away from the male. Misting that imitates rain helps. The breeding season in the wild is not documented for the species; in *Indotestudo travancorica* it runs from November to January.

EGG-LAYING AND CLUTCHES

Before laying, the female becomes restless and often tries to escape from the enclosure. She chooses a damp spot without vegetation and digs a flask-shaped nest 14-19 cm deep with her hind legs. If the soil is too hard and dry, she moistens it with urine. The clutch is 1-4 eggs, and the female may lay up to three clutches a year under good conditions. In captivity the eggs

are laid early in spring. Give her at least 30 cm of loose, damp soil.

INCUBATION

The eggs are incubated in damp vermiculite at about 80 % humidity and 26-30 °C, fully or partly buried in a small box with ventilation holes. The substrate is misted once or twice a week. The young typically hatch after 130-165 days. The effect of temperature on sex ratio is not documented.

REARING THE YOUNG

The young have a strongly serrated rear margin; their size at hatching is not documented for the species. A young tortoise is kept in a box of about 60 × 60 cm with high humidity, hides and a shallow water dish. Feed with narrow leaves and vegetables with calcium. Young from the same clutch vary greatly in colour and pattern. As animals from different sources can carry infection, the young should be raised in isolation from other groups.

Health and common mistakes

Animals taken from the wild are weakened and often require a vet, while captive-bred animals are far less vulnerable. The most frequent problems:

- Infection in newly imported animals: they often look healthy for some months and then collapse if they are not treated. This requires a vet and a long quarantine.
- Sores in the roof of the mouth, which are thought to be caused by herpesvirus. Examine the mouth thoroughly every time, at purchase and later. Foreign bodies in the sore can cause pneumonia, so animals with sores are not kept on grass outdoors.
- Respiratory infection: runny nose, bubbling at the nostrils and open-mouth breathing in cold and draughts. This requires a vet.
- Metabolic bone disease: soft shell and deformed legs from too little UVB or calcium.
- Parasites: new animals are quarantined for up to 90 days with a faecal sample examined by the vet before they are put together with other tortoises. Ivermectin must not be used.

A new animal may only be added to an existing group with the utmost caution, because there are no methods to determine which animals carry infection. Weigh the animal regularly and keep a log of weight and appetite. Contact a vet with reptile experience if the animal loses weight, does not eat, has discharge from the nose or seems lethargic. All reptiles can carry *Salmonella*; wash your hands after contact.

Read more: Quarantine and hygiene Read more: Common diseases and signs of illness

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.