herpy

TORTOISES AND TURTLES

Marginated Tortoise

Testudo marginata

Testudo marginata is Europe's largest tortoise, a black and yellow mountain dweller from Greece with an elongated shell that flares like a bell at the rear. The shell reaches 25-40 cm in length, the animal can live for more than 50 years, and it belongs outdoors in the summer half of the year, feeds on wild herbs and grasses and hibernates.

Family: Testudinidae

KEY FACTS

THE ANIMAL

Adult size	**25-40 cm** total length incl. tail
Lifespan	**50-70 years**
Active	**By day**
Lifestyle	**Terrestrial**
Habitat	**Semi-desert, rocky terrain and temperate woodland and meadow**
Difficulty	**Intermediate**

CARE

Min. enclosure	**240 × 120 × 40 cm** L × W × H for 1 adult
Temperature, day	**22-29 °C**
Basking spot	**35-38 °C**
Temperature, night	**15-20 °C**
Humidity	**50-70%**
Water	**Water dish**
UVB	**Essential** Ferguson zone 3
Winter rest	**4-6 °C** 8-16 weeks
Diet	**Plants**
Kept	**Singly or in pairs**

BREEDING

Reproduction	**Egg-laying**
Clutch size	**3-15 eggs**
Clutches per year	**1-3**
Incubation	**55-85 days** at 28-32 °C

PROTECTION AND PAPERWORK

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

About the species

Testudo marginata is the largest species in the genus *Testudo*. The shell (carapace) is elongated and thick in the middle of the body, and the rear edges of the shell are serrated and flare outwards like the rim of a bell. Adults are almost entirely black with yellow markings, and the plastron is yellow with paired, dark triangles. Juveniles are paler, cream-coloured with brown edges, without the flared rear edge. The forelegs have very large scales, the hind legs have cone-shaped scales on the thighs, the supracaudal scute is undivided, and the tail lacks a horny spur.

All measurements in the text are shell length. In the wild the animals reach up to about 35 cm, and in captivity up to 40 cm. Most females are 25-30 cm, while males are larger, which is unusual among *Testudo*. Large animals weigh 5-8 kg. The male has a more flared shell, a concave plastron, a larger head and a longer tail, where the female has a flat plastron and a short tail. In old females the rear of the plastron can be slightly hinged.

The species is closely related to *Testudo graeca*, and hybrids with *Testudo graeca ibera* have been described. A small, pale form from the south-western Peloponnese has been described as *Testudo weissingeri*, but it does not differ genetically from *T. marginata* and is treated here as a dwarf form. The so-called Sardinian form (*T. m. sarda*) is not scientifically recognised, and the population on Sardinia is introduced. The species was described by Johann David Schoepff in 1789.

Distribution and habitat

Testudo marginata is native to Greece and southern Albania. In Greece it is found from Mount Olympus southwards through the Peloponnese and on several Aegean islands, including Corfu, Skyros, Poros and Paros. The small form from the Peloponnese lives only on the western side of the Taygetos mountains between Kalamata and Areopoli. The populations in north-eastern Sardinia and at a few places in Italy and Turkey were introduced by humans and are not included on the map.

The species is found in mountain areas and on dry slopes up to about 1,600 m. It is assessed as Least Concern (LC) on the IUCN Red List.

> **Native range:** Greece and Albania.

HABITAT

The species lives in a dry, rocky and mountainous Mediterranean landscape with scrub, grassland, bushes and open slopes. It is found higher up than *Testudo hermanni* and can be encountered up to about 1,600 m. The black shell helps it absorb heat quickly on cool mountain mornings. It is solitary and keeps to a fixed area of a couple of hectares.

In the morning the animal basks and then goes in search of food, mostly grasses, herbs and other fibrous plants. In the midday heat it hides and only emerges again late in the afternoon. In winter the animals hibernate. Mating begins immediately after waking in spring, and the female lays her eggs in May and June.

Care

THE ENCLOSURE

Testudo marginata is not an animal for a closed terrarium. In the summer half of the year it must live in a sunny, well-drained outdoor enclosure of at least 10 m² per adult tortoise, and a pair or trio needs about 25 m². The wall must be opaque, at least 50 cm high and extend 20-30 cm into the ground, because the animal digs, and the enclosure is covered with netting against predators and crows. The substrate is well-drained soil with grass and herbs, preferably with gravel and sand. Build a greenhouse or cold frame with a heat lamp and a small opening, so the animal can get away from the heat on the hottest days, as well as a dry, closed hide in a sunny corner. Glass blocks UVB, so basking behind a window pane does not help.

Indoors, in spring and autumn and during hibernation, the animal needs an open tortoise table. The length must be 8 times and the width 4 times the shell length of the largest animal, so for an animal of 30 cm that is 240 × 120 cm with sides of about 40 cm. Less space is often used successfully, but the general recommendation is 8 × 4 times the shell length. Use 10 cm or more of soil mixed with coconut fibre, so the animal can dig in. Juveniles can at first live two or three together in a box of 90 × 60 cm with 10 cm of soil and a shallow water dish, but they must go out into the sun as soon as the weather permits.

Read more: Lighting and UVB Read more: Brumation and the seasons

TEMPERATURE

Outdoors, *Testudo marginata* must be able to warm up to at least 30 °C and seek shade when it gets too hot. Indoors the room must be 22-29 °C by day and the basking spot under the heat lamp 35-38 °C. Juveniles are kept at the warm end, at 27-29 °C. At night the heat is switched off, and the temperature may fall to 15-20 °C. Do not use heat rocks or heat mats.

Hibernation: the species hibernates in the wild, and healthy animals should do so in captivity. The temperature must be 4-6 °C, as close to 5 °C as possible, for at least 8-10 weeks and no more than 16 weeks, even for large animals. If the temperature falls towards 2.5 °C there is a risk of frost, which can blind the animal or kill it, and above 10 °C for a longer period the animal draws on its reserves. Animals that are sick, underweight or recently bought must not hibernate. They overwinter awake instead on an indoor tortoise table at 26 °C by day, 18-22 °C at night and light for 13-14 hours, never below 15 °C. See the section on health for preparation and checks.

Read more: Heat and temperature

HUMIDITY AND WATER

The species comes from a dry landscape, but needs moderate humidity, especially while it is growing. Juveniles need about 70 % and a humid hide with dampened soil or moss, while adults are kept at 50-70 %. Conditions that are too dry and too little fluid cause a lumpy (pyramided) shell. Keep the animal away from damp soil and wet lawn, because it is more susceptible to respiratory infection than *T. hermanni*. Replace damp moss often so that bacteria do not grow in it.

The animal drinks, especially after hibernation. Sink a shallow dish into the soil, and change the water daily. Juveniles are bathed for 15 minutes in lukewarm water three to four times a week, and adults are bathed a couple of times a week in water of about 24 °C for 10-30 minutes. Always bathe them under supervision, and fill the water to the chin.

Read more: Humidity, misting and ventilation

LIGHTING AND UVB

T. marginata is diurnal and needs UVB to produce vitamin D3 when it is not in direct sunshine. The best is unfiltered sunlight, which in the summer half of the year provides all the UVB the animal needs. Indoors, use a T5 tube for desert species (Ferguson zone 3, about 10-12 % UVB) mounted 25-40 cm above the animal, or a mercury vapour lamp of about 150 W, which provides heat and UVB at once and is well suited to larger animals. Replace the light source according to the manufacturer's instructions, because the UVB output falls long before it burns out.

The light is switched on for 12-14 hours a day. The tube distance is borrowed from *T. hermanni*.

Read more: Calcium, vitamins and supplements

FEEDING

T. marginata is herbivorous, and the diet must be high in fibre, low in protein, low in sugar and rich in calcium. The staple is wild herbs and grasses: dandelion, clover, plantain, meadow grass, thistle, vetch, bird's-foot trefoil, mulberry leaves, nettles and grass, and some of the food can be hay. Greens from the supermarket such as kale, mustard leaves, radicchio, endive and swede are only a supplement in small amounts, and lettuce is avoided. Keep the garden and enclosure free of pesticides and fertiliser, and wash gathered plants thoroughly.

Too much protein causes kidney damage, and too much fruit causes diarrhoea and parasites. Fruit, peas, meat and dog and cat food are therefore not part of the diet. Always keep a cuttlebone available so the animal can gnaw at it itself. Adults are given phosphorus-free calcium powder over the food only occasionally, while juveniles and females that are going to lay eggs get it twice a week. Feed daily in the season.

BEHAVIOUR AND HANDLING

The species is calm and well balanced, but not a pet to be picked up. The animal learns to know its keeper and readily comes when there is food. Handle it only when necessary, and always support the plastron.

The animal is solitary, and males are territorial and fight each other. Mating is rough, because the male chases the female, rams her with his shell and bites her legs. A male that is with the females all the time can seriously injure them. Keep the males in their own enclosure for a large part of the time, or put one male together with several females, and give the females plenty of hides. Females that are constantly chased eat less, lay eggs less often and get injuries to the shell and legs. Do not keep the species together with *Testudo graeca* or *T. hermanni*, because the species interbreed.

Breeding

SEXUAL MATURITY AND SEXING

The male has flared shell edges, a concave plastron, a larger head and a longer tail with a slit-shaped vent. The female has a flat plastron, a narrower head and a short tail with a wrinkled vent. Males are often larger than females. Age and size at sexual maturity are not documented for the species. The animals must be fully grown and in good condition before breeding.

MATING

Mating begins right after hibernation. The male chases the female, bites her legs, rams her and tries to mount her. During mating he opens his mouth, shows the red tongue and utters loud, deep calls, which is a clear difference from *Testudo hermanni*, which pipes in a higher tone. The female stands still and turns her head to the side. Give the female places to hide, and separate the animals if she is injured. A male can mate with several females on the same day, and a single female is easily exhausted by a male, so it is better to keep one male with several females.

EGG-LAYING AND CLUTCHES

The female digs a nest six to eight weeks at the earliest after a successful mating and lays her eggs in May and June. She digs a hole with her hind legs, moistens hard soil with water from the cloaca, rolls each egg into the hole and tamps it down afterwards. She lays 3-12 eggs per clutch, most often 6-8, and large females can lay up to 15. Most lay 1-3 clutches per season. Give her a sunny slope with deep, loose soil in the enclosure. If she cannot find a suitable spot, she can develop egg binding, and she must then go to a vet.

Read more: Common diseases and signs of illness

INCUBATION

The eggs are moved carefully, without turning them, to boxes with dry vermiculite in an incubator with a humidity of about 70 %. The vermiculite must be kept dry, because the eggs crack easily if they lie damp for a long time. At 28-32 °C the eggs hatch after 55-85 days, at 30-31.5 °C typically after 60-75 days. In the wild it takes about 100 days.

The sex depends on temperature: low temperatures give males, high ones give females. Leave the newly hatched young in the incubator until the yolk sac has been absorbed.

Read more: Incubating eggs

REARING THE YOUNG

The hatchlings are cream-coloured with brown edges. They need a lukewarm bath several times a week, a humidity of about 70 %, 10 cm of soil, UVB and a basking spot of about 35 °C. Let them grow slowly, and feed the same herbs as the adults, finely chopped. A cuttlebone must always be available. In summer they should go out into a secure, covered enclosure with shade and heated shelter.

Health and common mistakes

The species is more susceptible to respiratory infection than *Testudo hermanni*. The most frequent problems are caused by husbandry errors:

- Respiratory infection: runny nose, bubbling from the nose and open-mouth breathing, with cold, draughts and damp soil. Requires a vet, and the animal must be isolated.
- Mouth rot: yellow, cheesy deposits in the mouth, often after hibernation.
- Kidney failure with too much protein, diarrhoea and parasites with too much fruit.
- Pyramiding with too low humidity and too little drinking water.
- Bone disease (soft shell) with too little UVB or calcium.
- Frost damage after hibernation: blindness and disorientation.

Hibernation requires preparation. Only healthy animals in good weight may hibernate, and not animals that have just been bought. In August-September, check the eyes, nose, mouth, ears and tail for signs of illness. Weight relative to shell length gives a misleading picture in *T. marginata*, so instead follow the animal's weight from year to year in a logbook. Let the animal fast while it is kept at above 13 °C so the gut is emptied: 2 weeks for animals under 1 kg, 3 weeks for animals of 1-1.5 kg and about a month for animals of 2-3 kg. Bathe it 3-4 times a week during the fast so it drinks. Hibernation is kept at 4-6 °C, either in a rodent-proof box inside an insulated box in a frost-free place or in a refrigerator without a freezer used only for the tortoise. Use two thermometers, and move the animal at once if the temperature approaches 2.5 °C. Weigh the animal every week or every other week: if it loses more than about 1 % of its weight in a month, or has urinated, it must be woken. After 8-16 weeks the animal is taken out, given a lukewarm bath so it drinks and empties its bladder, and placed under a heat lamp so it can warm up to at least 30 °C. It must start eating within a week; otherwise it must go to a vet.

Contact a vet with reptile experience if the animal does not eat for a couple of weeks, loses weight or has discharge from the nose.

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.

The full guide with map and updates: herpy.org/en/tortoises-and-turtles/testudo-marginata