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TORTOISES AND TURTLES

Spur-thighed Tortoise

Testudo graeca

Testudo graeca is a robust tortoise from North Africa, southern Europe and the Middle East with a yellowish brown, domed shell and a horny spur on each thigh. It belongs outdoors in summer, lives on wild herbs and can live to be more than a hundred years old. Whether it should hibernate depends on where the animals come from.

Family: Testudinidae Former name: *Testudo ibera*

KEY FACTS

THE ANIMAL

Adult size	**15-30 cm** total length incl. tail
Lifespan	**50-100 years**
Active	**By day**
Lifestyle	**Terrestrial**
Habitat	**Semi-desert and temperate woodland and meadow**
Difficulty	**Intermediate**

CARE

Min. enclosure	**200 × 100 × 40 cm** L × W × H for 1 adult
Temperature, day	**22-30 °C**
Basking spot	**32-38 °C**
Temperature, night	**15-20 °C**
Humidity	**40-70%**
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	**1-7 eggs**
Clutches per year	**1-3**
Incubation	**55-85 days** at 26-32 °C

PROTECTION AND PAPERWORK

CITES	**Appendix II**
EU annex	**Annex A**
IUCN	**Vulnerable (VU)**

About the species

Testudo graeca is a tortoise with a domed, yellowish brown to olive shell with black markings. The distinguishing features are an undivided supracaudal scute, a distinct horny spur on each thigh and no horny spur at the end of the tail. The male is smaller than the female, has a longer tail and a slightly concave plastron, while the female's plastron is flat. Adults have a shell length (carapace) of 15-30 cm, measured in a straight line, not including head and tail. In Algeria the males grow to about 19 cm and the females to 23 cm, and the largest animals, from north-eastern Turkey, can weigh up to 7 kg.

The species is a species complex, and the populations differ in size, colour and pattern. Several forms have been described as subspecies or separate species, and *Testudo ibera* is often used for the eastern forms. The North African and the eastern forms have different requirements for winter, so it is important to know the animal's origin. The forms can interbreed with each other and with other *Testudo* species, and animals of different origin should not be paired.

The species was described by Linnaeus in 1758. It is among the longest-lived of the small tortoises: several animals in captivity have lived to be over 100 years old.

Distribution and habitat

Testudo graeca has a large, fragmented range around the Mediterranean. In North Africa it occurs from Morocco through Algeria and Tunisia to Libya. In Europe it occurs in southern Spain and in the Balkans in Greece, Albania, Montenegro, Serbia, North Macedonia, Romania and Bulgaria. To the east the range runs through Turkey and the Middle East (Syria, Lebanon, Israel, the West Bank, Jordan) to Iraq and Iran and on to the Caucasus, with populations in Georgia, Armenia, Azerbaijan and Dagestan in southern Russia.

The populations on Mallorca and Formentera, on Sardinia and Sicily and in southern France originate from introductions and are not shown on the map. The species is assessed as vulnerable.

> **Native range:** Spain, Morocco, Algeria, Tunisia, Libya, Greece, Albania, Montenegro, Serbia, Romania, Bulgaria, Turkey, Syria, Lebanon, Israel, Jordan, Iran, Iraq, Georgia, Armenia, Azerbaijan, Russia, North Macedonia and Palestinian Territories.

HABITAT

The species lives in dry and semi-arid areas: scrub, Mediterranean woodland, stony slopes, steppe and the edge of semi-desert, from the coast up into the mountains. The animals bask in the morning, seek shade in the midday heat and feed on herbs, leaves, flowers and grasses. Many dig down into depressions or burrows at night.

The climate and annual rhythm vary greatly. In the southern parts of the range, for example southern Morocco and Spain and the coast of Tunisia and Libya, winter is so mild that the animals are active and eat all winter, while they dig down and aestivate in the dry, hot summer. Farther north and east, in the Balkans, Turkey and the Caucasus, the animals hibernate and are active in summer. Mating follows shortly after the animals emerge in spring.

Care

THE ENCLOSURE

Testudo graeca belongs outdoors in the summer half of the year and is not at all suited to living in a closed glass terrarium. From spring to autumn it needs a spacious, dry and well-drained enclosure with sun, shelter, shade and wild plants to graze. The wall must be opaque, at least 30 cm high and go 20-30 cm into the ground, because the tortoise digs. Cover the enclosure with netting if there are foxes, rats or crows in the area.

The substrate should be drained soil with grass and herbs, and on heavy clay soil you need to dig out and lay in gravel and sandy soil. Furnish with stones, branches and a dry, closed shelter against rain. A greenhouse or a cold frame with a heat lamp provides warmth on cool days and extends the season.

Indoors, in cold periods and for the forms that are to be kept awake in winter, an open tortoise table is best. The length should be at least 8 times and the width 4 times the shell length of the largest animal: 200 × 100 cm for an animal of 25 cm and 240 × 120 cm for an animal of 30 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 a mixture of compost and sand without fertiliser, so the animal can dig down. Avoid fine sand and small pebbles, which the animals may end up eating.

TEMPERATURE

By day the temperature should be 22-30 °C, with a basking spot under a heat lamp of 32-38 °C, so that the animal can warm up to at least 30 °C. At night the temperature falls to 15-20 °C, and the heat is switched off. Measure the air temperature in the shade and the basking spot temperature under the lamp after a couple of hours.

Outdoors in a cool northern European climate a cold, wet summer is the greatest risk, because the animals become lethargic and develop respiratory infections. Give them a sunny location and a greenhouse or a heat lamp they can seek out. Overheating is at least as dangerous, so the animal must always be able to get into shade.

Hibernation: Animals from the eastern and northern populations hibernate, and healthy animals should do so in captivity. The temperature should be 4-6 °C, as close to 5 °C as possible, for at least 8-10 weeks and no more than 16 weeks, also for large animals. If the temperature falls towards 2.5 °C, there is a risk of frost, and above 10 °C for a longer time the animal wears down its reserves. Animals from regions with mild winters, for example southern Morocco and Spain and the coast of Tunisia

and Libya, are kept awake all winter with warmth and light. North African animals of other populations can hibernate if they are completely healthy. If you do not know the animal's origin, ask a vet with experience in tortoises. See the section on health for preparation and checks.

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

HUMIDITY AND WATER

The species comes from dry climates, and humidity should be moderate: 40-70 %, highest for young animals. The substrate should be dry at the surface and slightly damp farther down, so that the animal can dig down into a damper layer. A constantly damp substrate causes skin, shell and respiratory infections. There must always be a shallow, stable dish of fresh water, and the water is changed daily. In the wild the animals like to drink from puddles after rain.

Also give a lukewarm bath of 10-15 minutes a couple of times a week, especially to young animals. The water should reach the animal's chin. The bath makes the animal drink and empty its bladder, and it is important before hibernation and just after waking.

Read more: Humidity, misting and ventilation

LIGHTING AND UVB

T. graeca is diurnal and needs UVB to produce vitamin D3 and avoid bone disease. Use a T5 tube or a powerful UVB bulb for desert species (Ferguson zone 3, about 10-12 % UVB), mounted 25-40 cm above the animal. Replace the light source according to the manufacturer's instructions, because the UVB output falls long before the bulb fails. A mercury vapour lamp provides heat and UVB at once and is well suited to tortoise tables.

The light is on 10-14 hours a day and preferably follows the season. Outdoors in the sun the animals get UVB directly, but glass and acrylic block most of it. Do not therefore let them sunbathe behind a window.

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

FEEDING

Testudo graeca is exclusively herbivorous, and the diet must be high in fibre, low in protein and rich in calcium. The staple food is wild herbs, leaves, flowers and grasses, as many freshly picked ones as possible: dandelion, clover, plantain, dock and the like. Greens from the supermarket have too little fibre and are given only in small amounts. Vary the diet, so that no single plant becomes the only food. Fruit causes digestive problems and parasites, and meat or other protein-rich food causes kidney damage and too rapid growth with bone disease. Neither belongs in the diet.

Always keep a cuttlebone available, and sprinkle a phosphorus-free calcium supplement over the food at least twice a week, more often for young animals and females during the laying season. Commercial tortoise food can be used as a supplement, not as a staple. Feed daily in the season, and rapid growth must be avoided, because it produces a lumpy, pyramided shell.

BEHAVIOUR AND HANDLING

The species is robust and curious and can become very tame, but it is not an animal to pick up and cuddle. Handle it only when necessary, and always support under the plastron. Hold it low, so that a fall does not damage the shell.

The males are territorial and can injure each other and the females, especially in the breeding season: the male chases, rams and bites. Therefore keep only one male per enclosure, and give the females hiding places and space. The animal can also be kept alone. Never mix the species with other tortoises, not even other *Testudo* species: it is very susceptible to foreign pathogens, and respiratory infections are hard to cure. It likes to dig, so give it a depression with loose soil where it can sleep.

Breeding

SEXUAL MATURITY AND SEXING

The male is smaller than the female, has a longer and thicker tail and a slightly concave plastron, and the cloacal opening sits farther out on the tail. The female has a flat plastron and a shorter tail. Age and size at sexual maturity are not documented for animals in captivity and vary with form and growth. The animals must be fully grown and in good condition before breeding, and the two animals must come from the same area.

MATING

Mating takes place especially shortly after hibernation or, in animals without hibernation, in spring. The male chases the female, rams and bites her before he mounts her. A single mating can produce several clutches. Watch the animals, and separate them if the female is injured. Give the female places where she can get away from the male.

EGG-LAYING AND CLUTCHES

The number of eggs and clutches is not documented for the species. The figures are borrowed from *Testudo hermanni*, which lays 1-7 eggs per clutch and 1-3 clutches a year. Large females generally lay more eggs than small ones. The female digs a flask-shaped nest in loose, damp soil in a sunny spot, and the eggs are typically laid in early summer. Give her a sunny slope with deep, loose soil. She is restless in the days before and walks around scraping.

INCUBATION

Incubation time and temperature are not documented for the species; the figures are borrowed from *Testudo hermanni*. The eggs are moved carefully, without turning them, to boxes with dry vermiculite and a couple of air holes, in an incubator with a humidity of 70-80 % and 26-32 °C. At the highest temperatures they hatch after about 55-60 days, at the lowest after up to 85 days. The sex depends on temperature, so high temperatures give mostly females and low temperatures mostly males. Give eggs that do not hatch on time a couple of weeks extra before they are discarded.

Read more: Incubating eggs

REARING THE YOUNG

The young are small and live on the yolk sac for the first few days. Keep them in a box with moderate humidity, a warm spot of 32-35 °C, UVB and a very shallow water dish. Give a lukewarm bath several times a week. The young eat the same wild herbs as the adults, finely chopped, and a cuttlebone must always be available.

Let them grow slowly to avoid pyramiding. In summer they must go out into sun and fresh air in a tight, covered enclosure that protects against birds, rats and cold. Young from populations that hibernate can hibernate for a shorter time than the adults, typically 8-12 weeks.

Health and common mistakes

Most problems are caused by mistakes in care. The most common are:

- Pyramiding: the shell grows in knobs. Caused by too much protein, too little fibre, too little calcium and UVB or conditions that are too dry.
- Metabolic bone disease: soft shell and deformed legs and jaws from too little UVB, D3 or calcium.
- Respiratory infection: runny nose, bubbling at the nose and breathing with an open mouth, from cold, damp and contact with other tortoises. Requires a vet, and the animal must be isolated.
- Stomatitis: yellow, cheesy coatings or small haemorrhages in the mouth. Contagious and requires prompt treatment.
- Parasites and stomach problems: slimy or very loose droppings and weight loss.
- Frostbite and dehydration during hibernation.

Hibernation requires preparation. Only healthy animals in good weight from populations that hibernate may hibernate, and not animals that have just been bought. Check eyes, nose, mouth, ears and tail for signs of illness beforehand. Let the animal fast while it is kept above 13 °C, so that 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 that it drinks. Hibernation is kept at 4-6 °C, either in a box inside an insulated box in a frost-free place or in a refrigerator without a freezer that is 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 and placed under a heat lamp, so that it can warm up to at least 30 °C. It should begin eating within a week; otherwise it must see a vet.

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

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.