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TORTOISES AND TURTLES

Western Box Turtle

Terrapene ornata

Terrapene ornata is a small, terrestrial box turtle from the prairies of the central USA. The shell is dark with yellow radiating lines, and the plastron is hinged, so the animal can close itself completely inside. The species is diurnal, omnivorous, lively and long-lived, and it needs a dry, warm, well-drained substrate, strong light with UVB, plenty of space and preferably an outdoor enclosure in summer.

Family: Emydidae

KEY FACTS

THE ANIMAL

Adult size	**10-15 cm** total length incl. tail
Weight	**200-540 g**
Lifespan	**30-40 years**
Active	**By day**
Lifestyle	**Terrestrial and burrowing**
Habitat	**Semi-desert and savanna**
Difficulty	**Experienced**

CARE

Min. enclosure	**120 × 60 × 45 cm** L × W × H for 1 adult
Temperature, day	**21-25 °C**
Basking spot	**32-35 °C**
Temperature, night	**16-20 °C**
Humidity	**30-60%**
Water	**Water dish** depth 2-4 cm
UVB	**Essential** Ferguson zone 3
Winter rest	**5-8 °C** 8-16 weeks
Diet	**Insects, fruit, complete diet, plants and worms/snails**
Kept	**Singly or one male with several females**

BREEDING

Reproduction	**Egg-laying**
Sexually mature	**60-96 months**
Clutch size	**1-8 eggs**
Clutches per year	**1-2**
Incubation	**50-90 days** at 26-28 °C

PROTECTION AND PAPERWORK

CITES	**Appendix II**
EU annex	**Annex B**
IUCN	**Near Threatened (NT)**

About the species

Terrapene ornata is a small turtle with a low, rounded carapace that is dark brown to black with thin yellow lines radiating from the centre of each scute. The head and legs are dark with yellow, orange or red spots. The plastron is hinged, so the animal can draw in its head, legs and tail and close the shell tightly. The shell length (carapace) is 10-15 cm, and most adults are about 12 cm. Adults weigh 200-540 g. The species name *ornata* means "decorated" and refers to the pattern on the shell.

The sexes can be told apart by several features. The male has a red iris, a slightly concave plastron, a longer and thicker tail and a large, curved innermost claw on the hind legs. The female has a brown or yellow iris and a flat plastron and often grows slightly larger. Traditionally two subspecies are distinguished, *T. o. ornata* and the desert-dwelling *T. o. luteola*, which has more yellow stripes on the shell and body, but more recent taxonomy merges them. Care is the same.

The species was described in 1857 and is one of only two terrestrial turtles on the North American prairies. *T. ornata* is better adapted to dry, open country than *Terrapene carolina*, and it is more active and alert and bites more readily when it feels threatened. Adults spend a large part of their lives in burrows underground, where they avoid heat, drought and cold.

The species is long-lived: in the wild the animals reach 30-37 years, and the oldest over 40 years. Wild-caught animals tolerate captivity poorly and often die quickly, while acclimatised and captive-bred animals can grow old. *T. ornata* is not a species for beginners.

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

Distribution and habitat

Terrapene ornata lives in the central USA between the Rocky Mountains and the Mississippi: from Wisconsin, Illinois and western Indiana westwards across Iowa, southern South Dakota, Nebraska and Kansas to south-eastern Wyoming and Colorado, and southwards through Missouri, Arkansas, Oklahoma and Texas to south-western Louisiana. To the south-west it is found in New Mexico and south-eastern Arizona and on into northern Mexico (Sonora, Chihuahua and Coahuila), which is home to the desert-dwelling animals treated as *T. o. luteola*.

Populations have declined in many places because of agriculture, habitat loss, road traffic and collecting, and the species is assessed as Near Threatened. The map shows only the original range.

> **Native range:** United States and Mexico.

HABITAT

The species lives on open grass plains and prairies, in sandy areas with scattered shrubs, in desert grassland and in dunes. It needs grassland with food, loose, sandy soil to dig into, and shrubs or stones that provide shade. Water is used for drinking and for cooling off in hot weather, but the animals rarely stay in ponds and wetlands.

The animals are most active in the morning and in the late afternoon and come out after summer rain. On hot summer days they lie in burrows or shallow depressions at a depth of 20-50 cm. Body temperature is preferably kept at 25-30 °C during active periods. In winter they dig deeper, from 50 cm to almost 2 m depending on the cold, and hibernate from October to April. Each turtle overwinters in its own burrow, and the animals return to the same area year after year.

Care

THE ENCLOSURE

Terrapene ornata does best outdoors in a large, secure enclosure with well-drained soil. Choose a sunny spot with no standing water, with both sun and shade throughout the day. The wall must be at least 60 cm high, so smooth that the animal cannot climb it, and buried about 30 cm deep, and the top is covered with wide-mesh netting against predators. The animal digs and climbs well and quickly finds weak spots, so check the fence regularly. Plant shrubs and drought-tolerant, edible plants for shade and food, and lay flat stones, hollow logs and piles of leaves as hides. The soil layer outdoors must be at least 30 cm deep.

Indoors, an adult needs at least 120 × 60 × 45 cm. The size is based on the rule of 8 times the shell length for the length and 4 times for the width, and the height is raised to 45 cm so that lamps and UVB can sit at a safe distance. Less space is often used successfully, but the general recommendation is 8 × 4 times the shell length. The species is very active and uses all the space it gets, so bigger is better, and floor area matters more than height. Fit an opaque barrier of about 10 cm along the front glass, so that the animal does not pace back and forth along the glass; this is a sign of stress.

The substrate is a natural, well-drained mixture of about 60 % topsoil and 40 % play sand, at least 10 cm deep indoors. Lay leaf litter, flat stones and hollow logs on top, and provide at least two hides. Remove droppings daily, and change the whole substrate every 3-6 months. It is best to keep the species singly: it is not social, and males can be aggressive towards each other. If the animals are to be kept together, keep only one male with at least two females in a large enclosure.

Read more: Lighting and UVB

TEMPERATURE

Indoors there should be a basking spot of 32-35 °C and a cool zone of 21-25 °C. Use 50 W halogen spotlights, one for a young turtle and at least two for an adult, and measure the surface temperature of the basking spot with a digital probe. The heat is switched off at night, so that the temperature falls to 16-20 °C. Never use heat rocks, which cause dangerous burns.

Outdoors, the animal needs no artificial heat in summer. If the night temperature falls below 10 °C, there must be a covered hide with light-free heat, for example a ceramic heat emitter, that keeps about 16 °C. If there is a risk of frost, the animal must be brought indoors or put into controlled hibernation. Overheating is just as dangerous as cold, so there must always be shade and somewhere to dig in.

In the wild the species hibernates in winter, and healthy adults in good condition can overwinter indoors in a box. The figures are borrowed from *Terrapene carolina*: the animal first fasts for at least 2 weeks at normal temperature and is bathed in lukewarm water so that the gut empties. The temperature is then lowered gradually to a stable 5-8 °C in slightly damp moss or soil. Hibernation lasts 2-4 months. Frost is life-threatening. Young, sick, underweight and newly acquired animals are kept awake, and the animal is weighed regularly and woken if it loses significant weight.

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

HUMIDITY AND WATER

T. ornata tolerates drier air than other box turtles. Adults do well at an average humidity of 30-60 %, while young need 60-70 % so that they do not dry out. Measure with a digital hygrometer in the middle of the enclosure. The species must still not be kept too dry: there must always be a humid burrow in the cool end, a hide lined with dampened soil or moss where the animal can dig in. Dampen the substrate with a pressure sprayer first thing in the morning, but do not spray directly on the animal. Outdoors, part of the enclosure is watered in dry periods.

There must always be fresh water in a shallow, wide dish that the animal can sit in, for example a large plant-pot saucer, sunk into the substrate. The water may reach no higher than the animal's knees, that is 2-4 cm. The animal often defecates in the water, so it is changed daily, and the dish is scrubbed weekly with an animal-safe disinfectant; dirty water causes bacterial infections.

Read more: Humidity, misting and ventilation Read more: Quarantine and hygiene

LIGHTING AND UVB

T. ornata is diurnal and needs strong light and UVB to produce vitamin D3. Use a 6 % T5 HO UVB tube in a reflector fitting over the warm end, so that it overlaps with the heat lamps. If there is mesh between the tube and the animal, the back of the animal at the basking spot should be about 35 cm below the tube, without mesh about 45 cm. Aim for a UV index of 3-4 at the basking spot, and measure it with a UV meter. Replace the tube according to the manufacturer's instructions, because output falls long before the light goes out.

A UVB tube is nowhere near as bright as daylight. Supplement with a strong LED lamp of about 6500 K that covers at least three quarters of the length of the enclosure, especially if there are live plants. The light is on for 14 hours a day in summer and 10 hours in winter. Outdoors, artificial light is not necessary. Sunlight through glass does not provide UVB.

Read more: Calcium, vitamins and supplements

FEEDING

T. ornata is omnivorous. Young animals are mainly carnivorous, and adults eat more plant matter, but the species is still more carnivorous than other box turtles. The diet should overall be about half animal and half plant-based and very varied, because the species quickly tires of the same food and refuses it. Young animals get as much as they can eat every day. Close to adult size they are fed every other day to avoid obesity.

Animal food is earthworms, snails, woodlice, grasshoppers, crickets, cockroaches, millipedes, black soldier fly larvae, silkworms and a few mealworms; boiled egg can be included. Snails must be captive-reared or purged for a week on lettuce, so that they have not eaten slug pellets. Plant food is dandelion, leafy greens, berries, melon, tomato, squash, cactus pads and fruits and edible mushrooms. Commercial turtle food can be used as a supplement. Always serve the food on a dish or tray, so that the animal does not eat substrate.

Sprinkle calcium over the food once a week and a multivitamin once a month. The multivitamin must contain preformed vitamin A, not just carotenoids. A cuttlebone should be available as an extra source of calcium, and it also keeps the beak

worn down. Never use slug pellets or other poison near the animals.

Read more: Feeder animals: keeping and breeding

BEHAVIOUR AND HANDLING

T. ornata is active, alert and curious and sets off exploring as soon as it is put down. It is more inclined to bite than other box turtles if it feels threatened. Handle it only when necessary: lift the animal from below with the palm of your hand, and support both body and legs with two hands. A fall can injure or kill the animal. Wash your hands before and after. Many animals learn to take food from the fingers or tweezers, and captive-bred animals tolerate handling better than wild-caught ones. New animals need a couple of weeks to settle in before they are handled.

An animal that paces restlessly along the walls and scrabbles is stressed and lacks space and hides. Newly acquired animals are quarantined for at least 3 months and are not mixed with other turtles. Wild-caught animals and animals from the trade often have intestinal worms and must be examined by a vet. Before buying, check that the eyes are clear and that the animal eats.

Breeding

SEXUAL MATURITY AND SEXING

The sexes can be told apart by iris colour, the tail and the shape of the plastron (see the description). In the wild, males become sexually mature after about 5 years with a shell of 10 cm or less, females after about 8 years with a shell of at least 10 cm. How quickly animals in captivity become sexually mature is not documented. It is therefore common to see a small male trying to mate with a larger female.

MATING

The mating season runs from April to October. The male follows the female, stares at her, bumps her shell and climbs onto her, while she often runs away from him. Both sexes can mate with several partners, and the female can store sperm for a long time. In dry years mating may not take place, and the female may reabsorb the eggs. Keep only one male with at least two females, because a single female is harassed constantly, and separate the animals if a female is injured.

EGG-LAYING AND CLUTCHES

Egg-laying takes place in summer, mostly in July, and preferably two hours after sunrise or two hours before sunset. The female digs a flask-shaped nest of about 10 cm in loose, sandy soil, often under stones or plants, and lays 1-8 eggs, 3 on average. She lays 1-2 clutches a year and often skips a year after a large clutch. In the desert-dwelling animals (*T. o. luteola*) the clutches are smaller and the eggs wider. The eggs are white, elongated and weigh about 10 g. Give the female an undisturbed area with loose, slightly damp soil and extra calcium in the run-up to laying.

INCUBATION

The eggs can stay in the soil if the nest is protected from extreme weather and predators. If they are to be incubated artificially, uncover them carefully with a soft brush and move them without turning or shaking them. Place them on damp vermiculite or sphagnum in a closed plastic box, and put the box in an incubator at about 27 °C and about 80 % humidity. Check regularly that the substrate is damp.

The eggs hatch after 50-90 days, fastest at high temperature. Sex depends on temperature: at 29 °C and above the young are mainly females, below 28 °C mainly males. Moisture also affects the young: a damp substrate produces heavier young with longer shells than a dry one.

Read more: Incubating eggs

REARING THE YOUNG

The young can take several days to get out of the egg. Leave them be, and only mist the eggs lightly with lukewarm water. When the young turtle is out, it often has a yolk sac on its belly, which must not be burst. Leave it in the incubation box for a day or two, until the sac has been absorbed. It is then moved to a small plastic box with damp substrate, a shallow, wide dish of water and a hide, at a humidity of 60-70 %. The young are shy and may not eat for the first few weeks. Offer small worms, snails or woodlice, and then put new food alongside what they already eat. Daily baths in lukewarm water stimulate the appetite and get the gut going. Keep the young away from adults and other pets, and give them their own enclosure if they are outdoors.

Health and common mistakes

Most problems in *Terrapene ornata* are caused by wrong conditions. The typical mistakes are:

- A poor start in newly acquired animals, especially wild-caught animals and animals from the trade: intestinal worms, swollen eyes, weight loss and loss of appetite. Quarantine the animal, and have a vet with reptile experience examine it and a faecal sample.
- Ear abscesses and swollen eyes in animals kept too dry with no damp places to dig into.
- Respiratory infections and shell diseases, often together with dietary deficiencies. Provide UVB, calcium and vitamin A, and avoid cold and wet periods.
- Bacterial infections from dirty water and substrate. Change the water and remove droppings daily.
- Burns from heat rocks or lamps that sit too close.
- Obesity from overfeeding, especially in adults.
- Dehydration in young if the air is too dry.
- Injuries from falls and from predators outdoors.

Hibernation requires the animal to be healthy and in good condition. Contact a vet with reptile experience if the animal loses weight, does not eat for a couple of weeks, has discharge from the nose or eyes or is abnormally lethargic, or if it does not wake and eat again after hibernation.

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.