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TORTOISES AND TURTLES

Red-Footed Tortoise

Chelonoidis carbonarius

Chelonoidis carbonarius is a medium-sized, dark tortoise from the savannas and forest edges of South America with red to orange scales on the head and legs. The shell is typically 30-35 cm long, the animal lives for at least 50 years and is one of the most commonly kept tropical tortoises. It needs high humidity and warmth all year and eats plants, fruit and a little animal food.

Family: Testudinidae Former name: *Chelonoidis carbonaria; Geochelone carbonaria; Testudo carbonaria*

KEY FACTS

THE ANIMAL

Adult size	**30-45 cm** total length incl. tail
Lifespan	**50-70 years**
Active	**By day**
Lifestyle	**Terrestrial**
Habitat	**Savanna, dry forest and rainforest**
Difficulty	**Intermediate**

CARE

Min. enclosure	**280 × 140 × 60 cm** L × W × H for 1 adult
Temperature, day	**24-29 °C**
Basking spot	**32-35 °C**
Temperature, night	**20-23 °C**
Humidity	**70-90%**
Water	**Water dish**
UVB	**Essential** Ferguson zone 2
Diet	**Insects, fruit, plants and worms/snails**
Kept	**Singly or in groups**

BREEDING

Reproduction	**Egg-laying**
Clutch size	**2-7 eggs**
Incubation	**105-200 days** at 28-31 °C

PROTECTION AND PAPERWORK

CITES	**Appendix II**
EU annex	**Annex B**
IUCN	**Not Evaluated (NE)**

About the species

Chelonoidis carbonarius is a medium-sized tortoise with an elongated, highly domed carapace with almost parallel sides and a slightly flattened back. The shell is dark brown, grey or almost black with a pale yellow patch in the middle of each scute. The plastron is pale with a dark pattern. The head and legs are dark with large scales in yellow, orange or bright red, and it is these that have given the species its well-known appearance. Young animals are rounder, flatter and lighter brown, with serrated shell edges and stronger colours. Newly hatched young are about 4-5 cm.

All measurements in the text are shell length. Adults are typically 30-35 cm, 45 cm is not unusual, and the largest known animal was 60 cm and over 28 kg. Males are slightly larger and more colourful than females. The male has a concave plastron, a long, thick tail and, in some forms, a distinct waist constriction along the sides. The female has a short, cone-shaped tail. Size, colour and shell shape vary with origin: animals from Panama and Colombia are greyish and small, animals from the Gran Chaco are large, and animals from eastern Brazil are small with grey between the scutes and often a red head. Ask about the animal's origin and the size of the parent animals before you buy, so that you can plan space for an animal that will grow to 40 cm or more.

The species name *carbonarius* means "coal-like" and alludes to dark charcoal with glowing spots, that is, the dark scutes of the shell with their pale centres. The species was described by Johann Baptist von Spix in 1824. It has previously been placed in *Geochelone carbonaria* and *Testudo carbonaria*. It is closely related to *Chelonoidis denticulata*, which lives in deeper forest and has yellow scales. Hybrids between *C. carbonarius* and *Astrochelys radiata* have been described from captivity.

Distribution and habitat

Chelonoidis carbonarius occurs in northern and central South America and south-eastern Panama. The range extends from Panama and Colombia, both west of the Andes and east of them, through Venezuela, Guyana, Suriname and French Guiana to eastern and southern Brazil, where the species occurs from Roraima in the north to Rio de Janeiro and Rio Grande do Sul in the south, but hardly at all in the rainforest of the Amazon basin itself. It also occurs in Peru, eastern Bolivia, Paraguay and northern Argentina, and on Trinidad.

The species has also been introduced to several Caribbean islands, but the map shows only the native range. The species is not evenly distributed: it is absent from large, continuous forest areas and is most common in the transition between forest and open land. Populations are under pressure from the collection of eggs and adults for food and trade and from the destruction of habitats.

> **Native range:** Panama, Colombia, Venezuela, Guyana, Suriname, French Guiana, Brazil, Peru, Bolivia, Paraguay, Argentina and Trinidad & Tobago.

HABITAT

In most parts of its range the species lives in transition zones between forest and savanna: forest edges, scrub, open woodland, dry forest and grassland. The climate is warm and humid with a temperature around 30 °C that rarely drops below 20 °C or rises above 35 °C. In most of the area there is a cooler rainy season and a warmer dry season, but in places in the south cold spells can occur.

In the northern part of the range the climate changes little, and the animal can seek food all day, often mostly in the afternoon. It does not hibernate, but in the warmer and drier regions in the south it can aestivate in the driest months. It lives on a broad diet of leaves, grass, flowers, fruits, fungi and occasionally worms and other small animals, and it also eats carrion when the chance arises.

Care

THE ENCLOSURE

Chelonoidis carbonarius is an active tortoise that uses all the space it is given. It lives on the ground, so floor area is more important than height. In a temperate climate the indoor enclosure is the animal's real home for most of the year. An outdoor pen is a good supplement on warm summer days, typically from June to August, but the animal must come in when the daytime temperature is below about 18 °C. The pen must have a sunny part and a shaded part, well-drained substrate and an opaque wall at least 60 cm above ground that goes 30 cm into the ground. The animal tries to get through anything it can see through. Cover the pen with netting against predators and crows. If the night falls below 10 °C, as it often does in a cool northern European summer, the animal needs a closed, dry shelter with a non-light heat source holding 21-24 °C, or must be brought in at night.

Indoors the minimum size for an adult is 8 times the shell length in length and 4 times in width. Less space is often used successfully, but the general recommendation is 8 × 4 times the shell length. For an animal of 35 cm this gives 280 × 140 cm, and the enclosure must be at least 60 cm high. Each additional tortoise requires at least 1.5 m² of extra floor area. Use a closed vivarium or a table with a lid: open tortoise tables make it impossible to keep up humidity. Put an opaque strip of 10-15 cm along the front glass, so that the animal does not pace and stress against the glass.

The substrate should be a moisture-retaining, humus-rich soil mix (for example topsoil, coconut fibre and a little sand) at least 10 cm deep indoors and preferably 30 cm outdoors, so that the animal can dig in. Put at least 2-3 cm of leaf litter on top. Furnish with several hides, hollow logs, flat stones, soil mounds and a mud puddle, which the animal loves. At least one hide must be a humid hide lined with moistened sphagnum or leaves. In the first years young can live in a large plastic box or a closed tortoise table with the same furnishings.

Read more: Humidity, misting and ventilation

TEMPERATURE

Indoors there must be a gradient. The air temperature is 24-29 °C by day, and the basking spot under the heat lamp is 32-35 °C, measured on the surface itself. At night the temperature may fall to 20-23 °C, and young are kept warmer at night than adults. Use several halogen lamps or a mix of heat lamps and a radiant heat panel with a thermostat, so that the heat is spread over a large basking area. The lamp should sit at least 30 cm above the shell to avoid burns.

The animal is most active at 27-30 °C. Outdoors there must be enough shade for it to shed heat: summer temperatures up to 35 °C are tolerated when there is a cool, shaded spot. Cold nights are a greater risk, especially in combination with damp. If the night falls below 10 °C, the animal needs a heated shelter or must come indoors. The species must not hibernate. It needs warmth and light all year, also in winter, when activity may be somewhat lower.

Read more: Heat and temperature

HUMIDITY AND WATER

The species comes from a warm and humid climate and needs high humidity: 70-90 %, with short peaks towards 100 %. Moisten the soil layer and surfaces 2-3 times a day with a pressure sprayer or a misting system, and avoid spraying directly on the animal. A humid hide with moistened moss or leaves is always necessary, also outdoors, and the animal likes to dig into moist leaf litter.

Young and half-grown animals dry out much faster than adults and develop a lumpy shell if humidity is too low. Adults tolerate somewhat drier periods, but they must be kept dry on cold nights. Provide a shallow water bowl or a tub that the animal can easily get in and out of and sit in; the species loves to bathe. The bowl must be rinsed daily and disinfected every time the animal has defecated in it. Young are also bathed for 15-30 minutes in lukewarm water once or twice a week to ensure fluid balance.

LIGHTING AND UVB

C. carbonarius is diurnal and needs UVB when it is not in direct sun. Measure a UV index of 2.0-3.0 at the basking spot (Ferguson zone 2). This is achieved, for example, with a T5 HO UVB tube of 6 % at 30-35 cm distance or one of 12 % at 45-55 cm distance, when the tube sits over a mesh that attenuates the light a little. The tube should be about half as long as the enclosure and placed over the warm side. Replace it according to the manufacturer's instructions, because UVB output falls long before the tube fails.

Because the species lives at forest edges, it does not need very bright light, but a UVB tube alone does not give enough light. Supplement with a daylight LED lamp of about 6500 K covering most of the enclosure, particularly if you use live plants. The light follows the seasons: about 13 hours in summer and 11 hours in winter. Outdoors artificial light is not necessary, but glass and acrylic block UVB, so sunbathing behind a window does not help.

Read more: Lighting and UVB

FEEDING

C. carbonarius is an omnivore and in the wild eats plants, flowers, fruit, fungi and a little animal food. In captivity a split of about 90 % plant material and 10 % animal food works. The plants are roughly divided into 55 % fruit, flowers and leaves and 35 % grasses and vegetables, and the last 10 % is animal food and fungi. This is a different diet from the Mediterranean species that eat only plants: fruit is included, in moderate amounts.

The staple food is leaves and herbs such as dandelion, hibiscus, mulberry leaves and dark leafy greens, and to this come grass, hay, cactus pads and vegetables such as bell pepper, courgette and pumpkin. The fruit can be apples, berries, figs, mango, melon and papaya. Animal food is earthworms, farmed snails, mealworms, cockroaches and the like in small amounts, and to this come edible fungi. Vary as much as possible: in the wild the species has a very varied diet.

Young are fed daily with as much as they will eat. Near adulthood they are fed every other day to avoid obesity. Food is always served on a flat dish or stone, so that the animal does not eat soil. Sprinkle a calcium and vitamin supplement over the food a couple of times a week, and leave a cuttlebone available at all times, so that the animal can gnaw on it itself. Fast growth from too much protein causes a lumpy, deformed shell.

Read more: Calcium, vitamins and supplements

BEHAVIOUR AND HANDLING

The species is inquisitive, active and fairly calm. It gets to know its keeper, readily comes over when there is food and takes food from a hand or tweezers. It is not an animal to be picked up and cuddled: handling stresses it, and a fall can be fatal. When necessary, lift the animal from underneath with the whole hand and support both body and legs.

The animal can be kept alone or in groups of the same sex, as long as they are roughly the same size and there are plenty of hides and visual barriers, so that they can keep away from each other. Keeping groups requires a great deal of space and is difficult in the cold months. The males are the most intolerant of each other and can shove, overturn and bite. During mating the male chases the female, gives loud clucking sounds and bumps her with his shell. Do not mix the species with other tortoises, because they can infect each other. Pacing back and forth along the wall is a sign of stress.

Breeding

SEXUAL MATURITY AND SEXING

The male is slightly larger than the female and has a concave plastron, a long, thick tail, often carried to the side, and in some forms a distinct waist constriction. The female has a short, cone-shaped tail and a flatter plastron. Sex can usually be seen in larger young animals. The animals reach breeding size at about 20-25 cm shell length, depending on the local form. Age at sexual maturity is not documented, but the young animals grow quickly in the first 5-10 years and more slowly thereafter. The number of eggs and hatching success increase until the female is fully grown.

MATING

Mating takes place when the animals are in good condition and kept warm. The male follows the female, touches her shell and sniffs her cloaca while giving loud clucking sounds. He mounts her, stamps against her tail and utters a rasping bark. The female can push him off by walking on or by using low branches. Keep an eye on the animals, and separate them if the female is injured or cannot get away from the male. Give the female many hides. Do not keep several males with a few females.

EGG-LAYING AND CLUTCHES

The female begins to dig a nest five to six weeks after mating. She digs a flask-shaped nest of about 10 × 20 cm with the hind legs and spends several hours on it. She may dig several half-finished nests and abandon one she has started. Give her a sunny slope or a box with deep, loose and moist soil where she can dig and where the soil is not hard. The females lay 2-7 spherical eggs of about 5 × 4 cm and 50 g per clutch and often several clutches in succession a few weeks apart. The number of clutches per year is not documented.

INCUBATION

The eggs are carefully moved without being turned to an incubator, where they lie in a box of dry vermiculite at high humidity. Incubation time is 105-200 days and often about 150 days. Incubate the eggs at 28-31 °C; the temperature is borrowed from related tortoises. Sex probably depends on temperature as in other tortoises, but the limits are not documented for the species. The young open the egg with an egg tooth and stay in the egg or the nest for some days while the shell straightens and the yolk sac is absorbed.

Read more: Incubating eggs

REARING THE YOUNG

Young measure 4-5 cm and live on the yolk sac for the first days. Keep them in a closed box or a small vivarium with high humidity, a humid hide, 10 cm of soil and a warm spot of 32-35 °C. Provide UVB, a very shallow water bowl and a lukewarm bath several times a week. Feed daily the same herbs, leaves and fruits as the adults, in small pieces, and let them eat what they can. Low humidity causes a lumpy shell. The animals grow quickly, and if the weather permits, they should go out into sun and fresh air in a secure, covered pen with shade and heated shelter.

Health and common mistakes

The most frequent problems are caused by husbandry errors:

- Respiratory infection: bubbling nose, rattling breathing and mucus. Caused by cold and wet conditions. In the beginning more heat and slightly lower humidity for a couple of weeks can help, but if there is foam at the nose or mouth, a vet is needed.
- Lumpy shell and bone disease: too dry conditions, too little UVB or calcium and too fast growth. Lumpy shell is seen especially in animals raised in captivity; wild animals usually have a smooth shell.

- Dehydration: especially in young.
- Parasites: common in imported animals. Signs are loose droppings and weight loss.
- Digestive problems from substrate swallowed with the food.

Weigh the animal regularly: weight loss is often the first sign, because reptiles hide illness. A new animal must be quarantined before it is put with other tortoises. 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. Wash hands before and after contact.

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.