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TORTOISES AND TURTLES

River Cooter

Pseudemys concinna

Pseudemys concinna is a large, diurnal freshwater turtle from rivers and lakes in the eastern and central USA, with a flat shell decorated with yellow whorls. The shell can exceed 40 cm, and the animal can live for several decades. An adult needs a very large, filtered tank holding several hundred litres of water, a warm basking spot, strong UVB and a mainly plant-based diet.

Family: Emydidae

KEY FACTS

THE ANIMAL

Adult size	**22-44 cm** total length incl. tail
Lifespan	**20-44 years**
Active	**By day**
Lifestyle	**Semi-aquatic**
Habitat	**Wetland**
Difficulty	**Experienced**

CARE

Min. enclosure	**220 × 110 × 70 cm** L × W × H for 1 adult
Temperature, day	**21-31 °C**
Basking spot	**30-40 °C**
Temperature, night	**20-24 °C**
Humidity	**50-80%**
Water	**Aquaterrarium** depth 30-45 cm
Water temperature	**21-31 °C**
UVB	**Essential** Ferguson zone 3
Diet	**Insects, complete diet, plants and worms/snails**
Kept	**Singly**

BREEDING

Reproduction	**Egg-laying**
Clutch size	**10-20 eggs**
Clutches per year	**1-6**
Incubation	**80-150 days** at 26-30 °C

PROTECTION AND PAPERWORK

CITES	**Not listed**
EU annex	**Not listed**
IUCN	**Least Concern (LC)**

About the species

Pseudemys concinna is a large freshwater turtle that spends most of its time in the water and goes on land only to bask and lay eggs. The shell (carapace) is elongated, oval and relatively flat, with light and dark brown markings in green, yellow, brown and black. All measurements in the text are shell length. In young animals the shell is light green with clear yellow markings, and the markings are often whorl-shaped; with age the shell becomes darker, and the markings fade and disappear.

Hatchlings are 27-39 mm long and weigh 5-14 g. Adult females average about 29 cm and males about 22 cm, and the shell can reach about 44 cm; the largest animals weigh about 5 kg. The male has a flatter shell and very long claws on the forelimbs. The shape of the shell follows the current: in watercourses with a strong current the shell is flatter and lower, but weaker, than in animals from still water.

The species has two subspecies: the nominate *P. c. concinna* and *P. c. suwanniensis* from the Suwannee River, which some regard as a separate species. *Pseudemys floridana* was formerly a subspecies of *P. concinna* and is now regarded as a separate species. In the trade and in older literature the species are often mixed up, so take care to establish which species an animal actually belongs to.

Lifespan in captivity averages about 20 years, but some animals reach 44 years, and wild animals live to about 40 years. The species is shy and suits someone who can provide a very large tank and is prepared to keep the animal for many years.

Distribution and habitat

Pseudemys concinna is native to the eastern and central USA. The range runs from Virginia and North Carolina south to Georgia and the northern part of Florida, west to Texas, south-eastern New Mexico, eastern Oklahoma and south-eastern Kansas, and north to southern Missouri, Illinois and Indiana as well as Ohio and Kentucky. There are separate populations in the New River system in Virginia and West Virginia and in the Tennessee River system in Tennessee and eastern Kentucky. *P. c. suwanniensis* lives in southern Georgia and northern Florida.

Outside its original range the species has now been introduced in, among other places, Spain, Germany and California, because animals have escaped. The map shows only the original distribution.

> **Native range:** United States.

HABITAT

Pseudemys concinna lives in permanent fresh water: rivers with slow to moderate current, lakes, ponds and tidal marshes and floodplains with abundant aquatic vegetation and many basking sites. The animals are found at depths of 0-2 m and rarely in brackish water and saltwater outflows. They bask on logs and sun-warmed rocks, often together with other turtles, and slip into the water in a flash when threatened; the species is very shy and difficult to approach. Basking and egg-laying rarely take place more than about 30 m from the water.

Most of the time the animal lies on the bottom or moves around in search of food, and it can stay underwater for many hours at a time. At night it sleeps in the water, hidden under plants. Over most of the range the animals are active from April to October, and in colder regions they hibernate in the mud at the bottom of the water. Hibernation lasts from a couple of months to several months, and the animals can stay underwater for up to two months without coming up to breathe, because they take up oxygen through the cloaca. In the warmest regions, e.g. Florida, they are active all year. Adults eat mostly aquatic plants, grass and algae, while young animals also eat insects, crustaceans and small fish.

Read more: Brumation and the seasons

Care

THE ENCLOSURE

Keep the animal in a large aquarium, a tub or an enclosed indoor pond, not in an ordinary terrarium. Temperatures, lighting and feeding schedule are borrowed from the closely related *Trachemys scripta*, which lives in the same waters.

The tank must be at least five times as long as the shell and half as wide as it is long, with the land area counted as part of the floor area. The water must be at least twice as deep as the shell is wide. A female of 30 cm therefore needs at least 150 × 75 cm, and the largest females of 44 cm need 220 × 110 cm. A box measuring 220 × 110 × 70 cm gives a water area of 160 × 110 cm with 40 cm of water (about 700 litres), a land area of 60 × 110 cm and a 30 cm rim above the water. Bigger is always better.

Set up for an adult animal from the start. Water is heavy: 700 litres weighs 700 kg, so place the set-up on a floor that can bear it, preferably on the ground floor or in a basement. Tubs with opaque walls, such as feeding tubs and ready-made pond tubs, give a shy animal more peace than glass. Provide plenty of hiding places under water, e.g. by logs and plants. The land area must be large enough for the whole animal to get completely out of the water, and preferably large enough for it to take a walk. Build it as a shore or shelf with a rough ramp, and put down a large, flat stone as a basking spot, because stone conducts heat evenly. The lamp and UVB sit directly above the basking spot, and the rim around the land area must be at least 25 cm high. A female needs a box of soil or sand as a laying site.

The water is cleaned by a powerful filter, preferably an external canister filter, rated for at least 2-3 times the water volume. Preferably keep only one animal. The set-up must be completely escape-proof. An outdoor pond in summer is only acceptable if it is enclosed: a fence that goes at least 30 cm into the ground to stop digging, a tight fence against predators and netting over the top. Avoid fine-mesh netting, which cuts out much of the sun's UVB.

Read more: Lighting and UVB Read more: Heat and temperature

TEMPERATURE

The surface of the basking spot should be about 40 °C, measured with an infrared thermometer a couple of hours after the lamps are switched on, and the air above it 30-32 °C. Heat with halogen lamps in deep domes with ceramic fittings; two lamps give a larger and more even basking spot than one. The heat lamp must sit at the same distance from the basking spot as the UVB tube.

The water must be 21-31 °C for adults; young under a year need 24-29 °C and slightly larger juveniles 23-24 °C. Adults tolerate cooler water than the small ones, because they retain heat better after a spell on the basking spot. Set the water heater to the lowest temperature, so that a gradient arises in the tub. The heater must have a plastic guard so the animal does not burn itself, and an automatic cut-off. Measure the water with a digital thermometer by dipping the probe in. Avoid draughts, because sharp swings in temperature can cause respiratory infections.

At night the lamps are switched off, and in adults the water heater can also be switched off, so the water cools slightly. At night 20-24 °C is suitable. Hibernation is natural for the species in the colder regions, but not a requirement in captivity; an animal kept at an even warmth all year does not need it. If you want to give the animal a hibernation, give it only to a healthy, well-nourished animal after a vet check, at 3-5 °C for at most 14 weeks, and weigh the animal every second week.

HUMIDITY AND WATER

The turtle's moisture is the water itself, so the humidity of the air is not decisive; 50-80 % in the room is suitable. What matters is the cleanliness of the water.

The animal passes its droppings in the water, so the water quickly becomes dirty, and dirty water is a health risk for both the animal and you. Use a powerful filter, and change part of the water every 1-2 weeks; the filter alone is not enough. Remove food remains and debris with a fish net after feeding.

Read more: Humidity, misting and ventilation

WATER AND WATER QUALITY

The water is the animal's living space, so it must be deep, clean and warm. The water must be at least twice as deep as the shell is wide, and 30-45 cm suits adults. The temperature is 21-31 °C for adults (see Temperature). The species is native to watercourses, so the water may well have a gentle current from the filter.

The filter must filter both mechanically and biologically. The mechanical part removes food remains and droppings; the biological part, with sponge or ceramic rings, houses beneficial bacteria that convert toxic nitrogen waste. The bacteria need flowing water. A filter designed for fish is often too weak, so choose one rated for at least 2-3 times the volume of water. Undergravel filters, small internal filters and hang-on filters are not suitable for an adult animal.

Clean the filter at least once a month. Rinse the filter media in water from the tank, not from the tap, so the bacteria are preserved, and never use soap or chemicals. Unplug it with dry hands before touching the filter, and connect all electrical equipment near the water to a residual-current device (RCD). Do not clean the filter in the kitchen.

LIGHTING AND UVB

UVB is a necessity. The species is diurnal, basks a great deal and belongs to Ferguson zone 3. The UV index at the surface of the basking spot must be 3.0-4.0 and lower elsewhere in the setup, so the animal can choose. Use a T5 HO tube with a reflector that covers 50-75 % of the length of the setup and sits over the basking spot.

The distance from the tube to the animal's back is 28-33 cm for a tube with 5-6 % UVB and 43-53 cm for a tube with 10-12 % UVB. Never hang the tube closer than 25 cm to the basking spot, because then the radiation does not cover the animal evenly. Plastic and glass block UVB completely, and netting blocks a good deal, so there must be nothing between the tube and the animal. UVB tubes lose strength and must be replaced regularly.

Supplement with a strong daylight lamp of about 6,400 K. The light must be on for 11-13 hours a day, shortest in winter and longest in summer. Never use coloured light, not even at night, because the animal's eyes are very sensitive to colours.

FEEDING

In the wild *P. concinna* eats mostly aquatic plants, grass and algae and also takes plants at the water's edge and fallen fruit; it has tooth-like points in the upper jaw that help it tear through fibrous leaves. Young animals eat more animal food, for example aquatic insects, crustaceans and small fish, and some adults also eat carrion and small animals. The turtle eats in the water, so throw the food into the tank.

Animals under 1 year get roughly 50 % animal food and 50 % greens, animals over 1 year roughly 25 % animal food and 75 % greens. In the wild the species is more herbivorous than *T. scripta*, so adults must have a diet consisting mainly of greens. Greens are given every day; animal food 1-2 times a week; pellets 2-3 times a week. A portion of greens corresponds to the size of the shell, and a portion of pellets to the size of the head.

Greens: duckweed, water lettuce, water hyacinth, dandelion, clover, chickweed, leaf lettuce, endive, kale, chard and turnip tops. Fruit is an occasional treat. Never give avocado, onion, tomato, citrus fruit, mushrooms, rhubarb or hot peppers. Animal food: earthworms, mealworms, cockroaches, crickets, shrimp and krill and snails from breeders; whole animals are better than pieces. Wash plants from the wild and use only those that have not been sprayed and are positively identified.

The animal gets calcium through pellets and a cuttlefish bone in the tank, so the animal can regulate its own calcium intake. Always remove the hard plastic backing first, and replace the cuttlefish bone every 1-2 months.

Read more: Feeder animals: keeping and breeding Read more: Calcium, vitamins and supplements

BEHAVIOUR AND HANDLING

P. concinna is diurnal and very shy: at the slightest movement or sound it slips from the basking spot into the water. It does not like being handled and should be lifted only when necessary. If the animal must be lifted, take it from below with the palm of your hand and support the shell with both hands, so body and legs are supported. The animal can scratch with its claws and bite with its sharp beak. Wash your hands thoroughly before and after, and do not let children under 5 handle the animal.

The animal thrives alone. Several animals together require a tank at least 50 % larger, several basking spots and hiding places, and can lead to bites and fighting over the basking spot.

Breeding

SEXUAL MATURITY AND SEXING

The male has a flatter shell and very long claws on the forelimbs, while the female grows larger: on average about 29 cm against the male's 22 cm. Females reach sexual maturity after about 6 years and males after about 13 years; the figures are based on few animals. Growth continues throughout life but slows after 7-15 years in males and 13-24 years in females.

MATING

Mating takes place in spring in the water. The male follows the female and swims over her, stretches his neck forward and strokes her face and shell with the long claws; he may also bite the edge of the shell. If the female is receptive, she swims to the bottom and lets the male climb on. The female can store sperm for several weeks, and up to 30 % of clutches have several fathers. A female kept with a male must be able to get away from him.

EGG-LAYING AND CLUTCHES

The female lays eggs from the end of April to mid-July. She lays 10-20 eggs per clutch, on average about 15, and 1-6 clutches a year, on average 2-3. The eggs are oval with hard, pink to white shells and about 36-44 mm long. With her hind legs she digs a hole about 12 cm deep and 7 cm across the opening in sand or soil, often on raised ground near the water, lays the eggs in it and covers them. A female must always have a box of soil or sand on the land area, even when kept alone, so she has somewhere to dig.

INCUBATION

The eggs hatch after 80-150 days, depending on temperature and the position of the nest, most often after 90-100 days, and the young emerge in August and September. At 30 °C they hatch about three weeks earlier than at 26 °C, without the young being smaller. The sex is determined by the incubation temperature: at 22.5 °C all the young become males, at 25 °C about 90 %, and at 30 °C all become females. For artificial incubation 26-30 °C is suitable. In colder regions young can overwinter in the nest.

Read more: Incubating eggs

REARING THE YOUNG

The young fend for themselves from hatching; the parents look after neither eggs nor young. Young are 27-39 mm and 5-14 g, and the shell is light green with clear yellow markings. Young need water at 24-29 °C around the clock, plenty of hiding places and a basking spot they can easily climb onto. They get more animal food than adults and greens every day (see Diet). If several young are kept together, they must be the same size, and all must get food.

Health and common mistakes

Turtles hide illness, so watch for changes. Weigh and measure the animal 1-2 times a month, and keep a weekly log of weight, appetite and behaviour. Sudden weight loss is often the first sign of illness.

Typical problems and mistakes in care: - Dirty water if the filter is too weak or the water is not changed. - Calcium deficiency and diseases of bones and shell from too little UVB or calcium. Provide UVB and a cuttlefish bone without a plastic backing. - Swallowed plastic from the cuttlefish bone or furnishings. - A tank too small for an animal that grows large, in which it cannot swim or hide. - Draughts or air that is too cold, which can cause respiratory infections.

All reptiles can be symptom-free carriers of Salmonella and infect humans. Wash your hands before and after contact with the animal, water and equipment, and do not let children under 5 handle the animal. After a bite the wound must be rinsed under running water for about five minutes and cleaned with mild soap; see a doctor for deep, bleeding or inflamed wounds.

See a vet with reptile experience if the animal loses weight, does not eat, has an open mouth or seems lethargic.

Read more: Quarantine and hygiene

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.