herpy

TORTOISES AND TURTLES

European Pond Turtle

Emys orbicularis

Emys orbicularis is a diurnal, semi-aquatic freshwater turtle from southern, central and eastern Europe, North Africa and western Asia. The shell typically reaches 15-20 cm, and the animal can live for many decades. The species is best kept in a large, sunny, escape-proof garden pond where it can also hibernate, and it needs sun or UVB, warmth in summer and a cold winter rest.

Family: Emydidae

KEY FACTS

THE ANIMAL

Adult size	**12-23 cm** total length incl. tail
Weight	**400-700 g**
Lifespan	**30-100 years**
Active	**By day**
Lifestyle	**Semi-aquatic**
Habitat	**Wetland**
Difficulty	**Intermediate**

CARE

Min. enclosure	**120 × 60 × 65 cm** L × W × H for 2 adults
Temperature, day	**25-30 °C**
Basking spot	**35 °C**
Temperature, night	**18-20 °C**
Humidity	**50-80%**
Water	**Aquaterrarium** depth 30-40 cm
Water temperature	**24-28 °C**
UVB	**Essential** Ferguson zone 3
Winter rest	**4-6 °C** 8-16 weeks
Diet	**Insects, complete diet, plants, vertebrates and worms/snails**
Kept	**In pairs or one male with several females**

BREEDING

Reproduction	**Egg-laying**
Sexually mature	**48-216 months**
Clutch size	**3-20 eggs**
Clutches per year	**1-2**
Incubation	**60-120 days** at 26-31 °C

PROTECTION AND PAPERWORK

CITES	**Appendix III**
EU annex	**Annex C**
IUCN	**Near Threatened (NT)**

About the species

Emys orbicularis is a small to medium-sized freshwater turtle with an oval, relatively flat upper shell (carapace). The shell is dark brown to black, often with a pattern of fine yellow dots or streaks radiating from the centre of each scute. The head, neck and legs are dark with yellow spots, and the lower shell (plastron) is yellow to almost black. The tail is long and in adults reaches about half the length of the shell. All measurements in the text are shell length.

Size varies greatly with origin. The smallest forms stay under 12 cm, most animals reach 15-20 cm, and the largest forms from eastern Europe reach about 23 cm. Southern forms are smaller than northern and eastern ones. Females grow larger than males, and an adult typically weighs 400-700 g, in rare cases up to 1,500 g. The male has a thicker tail base, the vent opening beyond the rear edge of the shell and more strongly curved front claws. In many forms the male has a red iris and the female a yellow one. In older animals the plastron has a hinge that gives the front lobe a little movement.

The species is divided into up to 14 described subspecies, of which about 11 are regarded as valid, and they differ partly in size and colour. The subspecies determines in particular how large the turtle becomes and which climate it is adapted to, so the origin should be known.

Lifespan is long: females use the same nesting sites for over 70 years, and some animals live past 100 years. In the wild the species is shy and cautious, but animals in captivity quickly become tame and learn to associate a person with food. They are not animals suited to being handled.

The species is rare and declining in large parts of its range and is assessed as Near Threatened. The threats are drainage of wetlands, destroyed nesting sites, traffic and introduced predators and turtles.

Distribution and habitat

Emys orbicularis lives in southern, central and eastern Europe, in North Africa from Morocco to Tunisia and in western Asia eastwards to the Aral Sea and northern Iran. To the north the species reaches Lithuania and Latvia, and in Russia the range extends to the latitude of Moscow. To the south it is found from the Iberian Peninsula through France, Italy, the Balkans and Greece to Turkey and the Caucasus.

After the last ice age the species also lived in Denmark, Sweden and England, as subfossil finds show. North-western and central Europe now have only scattered populations, and many records here are released or escaped animals. The countries on the map are the native range, and some of them have only a few living populations.

The taxonomy is not final: 14 subspecies have been described, and genetic studies have found up to 20 lineages. The Sicilian species *Emys trinacris* was separated as a distinct species in 2005.

> **Native range:** Morocco, Algeria, Tunisia, Portugal, Spain, France, Italy, Germany, Austria, Poland, Hungary, Slovakia, Romania, Bulgaria, Croatia, Slovenia, Bosnia & Herzegovina, Serbia, Montenegro, North Macedonia, Albania, Greece, Turkey, Ukraine, Moldova, Belarus, Lithuania, Latvia, Russia, Kazakhstan, Georgia, Armenia, Azerbaijan, Iran and Turkmenistan.

HABITAT

Emys orbicularis lives in still or slow-flowing water: ponds, lakes, ditches, river backwaters and the edges of bogs. The species prefers water with plenty of aquatic vegetation, a muddy bottom and shallow, sun-warmed water. In the southern part of its range it is also found in streams and in brackish river mouths.

The animals bask on fallen branches, roots, tussocks and banks in the water and slip quickly into the water if something approaches. They often lie with only the nose and eyes above water and watch their surroundings. The species is only semi-aquatic: it moves on land up to several hundred metres from the water and in some cases can travel several kilometres. Females seek dry, sandy, sunny slopes for egg laying, usually less than 500 m from the water, and return to the same place year after year.

In winter the species hibernates in the water, buried in mud on the bottom. It stops eating, its metabolism drops sharply, and oxygen uptake takes place partly through the cloaca. The animals do not emerge again until spring, and mating often begins in February or March.

Care

THE ENCLOSURE

Adult *Emys orbicularis* are best kept outdoors in an enclosed garden pond with sun, plants and a soft bottom. An aquaterrarium is only for juveniles, for quarantine and for animals that need special care, or as summer housing where there is no room for a pond.

The pond must be at least 100 cm deep at its deepest point, so that the water does not become too warm in summer and does not freeze to the bottom in winter. The banks must slope gently and be rough, because in spring the animals are still too sluggish to swim well and walk up the bottom to the surface. Provide shallow, sun-warmed water with dense plant growth, at

least 20-30 cm of mud and dead leaves on the bottom of the deep part for the winter rest, and several basking spots of stones, roots or floating branch rafts. Allow at least 1 m² of pond per animal; more space gives more natural behaviour.

The species climbs and digs well. The fence must be smooth, at least 50 cm high with the top edge angled inwards and go at least 50 cm down into the ground. Netting over the enclosure protects against birds of prey, crows and cats and is necessary if juveniles are present or eggs have been laid. Females need a sunny, sandy egg-laying area on land.

An indoor aquaterrarium for an adult pair must be at least 120 × 60 × 65 cm with 30-40 cm of water: 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 included, and the water at least twice as deep as the shell is wide. The third and fourth turtle need at least 10 % more floor area, and from the fifth 20 % more. The land area must be large enough for the animals to come right out and dry off, and a female needs a box with 15-25 cm of moist sand and soil for egg laying, even when kept without a male. The edge above the land area must be at least 1.5 times the shell length and smooth. The base can be bare so that the tub is easy to clean, and floating plants, roots and dry reeds provide cover.

Water is heavy: 200 litres weighs 200 kg, so place an indoor setup on a floor that can bear it. A filter in an aquaterrarium must be able to move the whole volume of water 1-3 times an hour and must not create so much current that small animals are sucked against it.

The subspecies and lineages are adapted to different climates and should not be mixed, and animals must never be released into the wild.

Read more: Quarantine and hygiene

TEMPERATURE

In an outdoor pond the temperature follows the season, and the animals regulate their own heat by basking. The pond must be sunny and sheltered. The species basks when the air is above about 14 °C, and the active season lasts from April to October.

Indoors the surface of the basking spot should be about 35 °C, measured with an infrared thermometer, and the daytime air 25-30 °C in summer. The basking spot should be 5-6 °C warmer than the water, and the lamp is placed at one end so that the animal can choose between warm and cool. Heat with halogen lamps or mercury vapour lamps; ceramic heaters warm the room but are not suitable for the basking spot. The water should be 24-28 °C, and at night the air drops to about 18 °C. Use a water heater with a guard so that the animal does not burn itself.

Avoid long periods at 15-21 °C. It is too cold for digestion and the immune system to function, but too warm for a proper hibernation.

Hibernation is part of the species' annual rhythm. In the wild the animals withdraw from November to March and bury themselves in mud and leaves on the bottom of shallow water with dense vegetation. Only healthy animals in good condition may hibernate, and a vet check a few weeks beforehand is a good idea.

In a pond of at least 100 cm with 20-30 cm of mud, the animals decide for themselves when hibernation begins and ends, and it typically lasts 5-6 months. The mud layer must not be so thick that the bottom becomes oxygen-free. Never break a hole in the ice, as it disturbs the animals. A pump or air stone hanging about 30 cm below the surface can keep a small hole ice-free without mixing the cold surface water down into the depths.

Indoor hibernation takes place in water in a cold room or a fridge without a freezer compartment. Feeding is stopped, and the animal is kept for 1-2 weeks at 21-27 °C so that the gut empties before the heat is switched off. Then light and temperature are lowered gradually. During hibernation the water is kept at 4-6 °C for 8-16 weeks, with water 1-2 cm above the shell and dead leaves as cover. Above 10 °C the animal uses up its reserves without resting, and below 2 °C there is a risk of frost. The animal may lose at most about 1 % of its weight per month.

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

HUMIDITY AND WATER

Humidity is not decisive for a water turtle, and 50-80 % in the room is ample. What matters is the cleanliness of the water.

The animal passes its droppings in the water, and the water quickly becomes dirty in an aquaterrarium. Without a filter the water is changed completely several times a week in small tubs and once a week in a tub of a good 200 litres; new water must be at the same temperature as the old. With a powerful filter the changes can be partial. An aquaterrarium with turtles must not smell strongly; if it does, the cleaning is inadequate.

Read more: Humidity, misting and ventilation

WATER AND WATER QUALITY

The water is the animal's home, so it must be deep, clean and full of hiding places. Indoors, adults need 30-40 cm of water at 24-28 °C. In a pond there must be a shallow zone with plants where juveniles and females can bask and forage, and a deep zone of at least 100 cm for the winter rest.

A planted pond with a large volume of water can often stay clear without a filter when plants, small animals and bacteria are in balance. If a filter or pump is used, the intake must sit in the upper half of the pond, and the water must return gently so that the warm surface and the cool depths are not mixed.

In an aquaterrarium the filter must filter both mechanically and biologically and be large; small aquarium filters are not suitable, because turtles make far more mess than fish. The species thrives in neutral to slightly acidic water. Rinse the filter in water from the tub, not from the tap, so that the bacteria are preserved, and never use soap in the tub. Connect all electrical equipment near the water to a residual-current device (RCD).

LIGHTING AND UVB

Outdoors the animal gets the sun's own UVB when there is no glass or dense netting in between, and the basking spots must be in full sun for most of the day.

Indoors UVB is necessary. The species belongs to Ferguson zone 3, and the UV index at the basking spot should be about 3-4 and fall to 0 in the water and in the shade, so that the animal can choose for itself. Use a T5 HO tube with a reflector or a powerful UVB lamp over the basking spot, and preferably measure with a UV meter. The distance from a T5 HO 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. Glass and plastic block UVB, and mesh blocks 40-50 %. UVB tubes lose strength and must be replaced regularly.

The light should have a colour temperature of about 5,000 K and follow the season: about 12 hours in summer and shorter in spring and autumn. Never use coloured light.

Read more: Lighting and UVB

FEEDING

Emys orbicularis is omnivorous with the emphasis on small animals. In the wild it eats insects and their larvae, especially dragonfly nymphs, snails, crustaceans, worms, tadpoles and dead fish, but also aquatic plants. The turtle eats in the water, so the food is given in the tub or the pond.

Adults are fed 1-3 times a week, more often in warm weather and less often when it is cool; young are best fed daily. An adult eats about 5 % of its weight per meal. If there are leftovers from the last time, give less. Do not feed when the water is below about 16 °C, because digestion then stops. In autumn the amount is gradually reduced towards hibernation, and in spring feeding does not begin until the animals have been up for a few weeks.

Earthworms, shelled snails, mosquito larvae, crickets, locusts and freshwater fish such as roach and guppies can make up most of the diet. Live food makes the animals hunt. Avoid fish with thiaminase, for example goldfish, carp and smelt, and feed only a little frozen fish, because freezing destroys vitamin B1. Saltwater fish and mussels are not recommended, and gammarus alone does not give a complete diet. Prepared food for water turtles and duckweed and Canadian pondweed can supplement.

The animal gets calcium from a cuttlebone or crushed eggshells in the water, and a vitamin and mineral supplement is useful for animals that do not find food themselves in a pond. Always remove the hard back of the cuttlebone. In a natural pond with fish, insects and snails the animals find a large part of their food themselves.

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

BEHAVIOUR AND HANDLING

E. orbicularis is diurnal and in the wild shy and cautious. In captivity it quickly gets used to its keeper and comes to the feeding spot, but it does not like being handled. The species has no teeth, but a sharp beak, and a bite can draw blood.

If the animal has to be lifted, take it from below and support body and legs. Wash your hands before and after, and do not let children under 5 handle the animal.

The species lives in populations with both sexes, and a pair or a male with several females works well. Males can be aggressive towards each other, especially in the breeding season and with little space, so there must be hides and several basking spots, and it is an advantage to have an extra installation for a male that needs to be separated. Do not keep the species with other turtles, snakes or lizards, because there is a risk of transmitting diseases. An animal that constantly swims back and forth along the glass often has too little space or too few hides.

Breeding

SEXUAL MATURITY AND SEXING

The male has a thicker and longer tail base, the vent opening beyond the rear edge of the shell and more strongly curved front claws, and in many forms a reddish iris. The female is larger and most often has a yellow iris. The age at sexual maturity depends on the climate: males in southern Spain are sexually mature after about 4 years, females in the coldest areas only after up to 18 years. The average is about 8-10 years.

MATING

In the wild mating begins early in spring after hibernation, often in February or March. The male drives the female out into the water, climbs onto her and grips the carapace. With swinging head movements and snapping he makes her pull in her head, so that the cloaca is freed. Males can be rough with the female, so there must be room for her to get away. Hibernation before mating is part of the normal annual rhythm.

EGG-LAYING AND CLUTCHES

The female digs a flask-shaped nest, 10-12 cm deep, with her hind legs in dry, sandy, sunny soil, most often in June and in the late afternoon or evening on warm days. Hard soil is softened with water from the bladder. A clutch contains on average about 10 eggs, typically 3-16 and in some cases over 20. The egg is about 20-25 mm long and weighs 6-10 g. The number is larger to the north and smaller to the south, where a second clutch often follows about a month later. The female closes the nest carefully and leaves it.

A female must have an egg-laying area with sand and soil in full sun, even when she is kept alone. If there is nowhere to lay, she may become egg-bound and must go to a vet. The eggs are carefully dug up and moved to the incubator without being turned.

Read more: Incubating eggs

INCUBATION

The eggs are incubated half buried in damp vermiculite, perlite or a mixture of peat and sand at 80-90 % humidity. At 26-31 °C they hatch after 60-90 days; in the wild it takes 80-120 days, and in the northern parts of the range the young may stay in the nest and overwinter there. Temperatures above 33 °C damage the embryos.

Sex is determined by temperature during a period of about 12 days in the middle of incubation: below 28 °C gives males, above 29.5 °C females, and in between both sexes are obtained. The temperature that gives equal numbers of each sex is about 28.5 °C. Close to that limit mortality is higher, so it is better to incubate at 26-27 °C or 30-31 °C. A slight drop in temperature at night gives more robust young. In the wild hereditary factors also play a part.

The young have a shell length of 2-3 cm and weigh 3-6 g.

REARING THE YOUNG

The young fend for themselves from hatching, and the parents look after neither eggs nor young. They get their first food after about a week: small earthworms, mosquito larvae, daphnia, small crickets and duckweed, preferably every day.

Young are kept indoors for the first year in an aquaterrarium with shallow, warm water at 24-28 °C, plenty of plants and hiding places, UVB and a basking spot they can easily climb onto. The filter must not create so much current that they are sucked against it. In the wild the young go into winter rest as early as their first winter, and a short winter rest at 4-6 °C with 1 cm of water and plants is the natural thing. The young can also be kept awake and warm during the first winter; they then grow faster, and this is used in breeding programmes to increase survival. Small or weak young must always be kept awake. Young are very exposed to predators and rats and may only go into an outdoor pond with netting and a tight fence.

Health and common mistakes

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

Typical problems and mistakes in care: - Dirty water: the water quickly becomes a health risk and causes shell infections if the filter is too weak or the water is not changed. - Calcium deficiency and bone and shell diseases from too little UVB or calcium. - Wrong hibernation: water above 10 °C, too short a fast, frost, mud that is too thick and oxygen-free, or too low a weight before hibernation. An animal that is ill or underweight must not hibernate. - Obesity from fatty food or free feeding. - B1 deficiency from fish with thiaminase or a lot of frozen fish. - Swallowed plastic from cuttlebone or furnishings. - Escape and predators from a leaky fence or missing netting.

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.

Seek a vet with experience in reptiles if the animal loses weight, does not eat, has an open mouth, swollen eyes or seems lethargic.

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/emys-orbicularis