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TORTOISES AND TURTLES

Gopher Tortoise

Gopherus polyphemus

Gopherus polyphemus is a large, dark tortoise from dry, sandy woodland in the south-eastern USA. It digs burrows up to 12 m long, which several hundred other animal species use as shelter. The shell length is 23-30 cm. The species needs a large outdoor enclosure with deep, dry sandy soil, plenty of grass and an artificial burrow.

Family: Testudinidae

KEY FACTS

THE ANIMAL

Adult size	**23-30 cm** total length incl. tail
Weight	**2,000-6,000 g**
Lifespan	**60-100 years**
Active	**By day**
Lifestyle	**Burrowing**
Habitat	**Savanna**
Difficulty	**Experienced**

CARE

Min. enclosure	**200 × 100 × 40 cm** L × W × H for 1 adult
Temperature, day	**24-30 °C**
Basking spot	**32-36 °C**
Temperature, night	**18-22 °C**
Humidity	**40-70%**
Water	**Water dish**
UVB	**Essential** Ferguson zone 3
Diet	**Plants**
Kept	**Singly or in pairs**

BREEDING

Reproduction	**Egg-laying**
Sexually mature	**108-240 months**
Clutch size	**3-15 eggs**
Clutches per year	**1**
Incubation	**60-90 days** at 30-31 °C

PROTECTION AND PAPERWORK

CITES	**Appendix II**
EU annex	**Annex B**
IUCN	**Critically Endangered (CR)**

About the species

Gopherus polyphemus is a sturdy tortoise with a low, elongated carapace that is at least twice as long as it is high. The shell is dark brown to grey-black, and the plastron (underside) is yellow and hingeless. The forelimbs are broad and shovel-shaped, covered in scales and built for digging, while the hind legs are columnar like an elephant's. All measurements in the text are shell length. Adults are typically 23-30 cm long and weigh 2-6 kg, about 4 kg on average; the largest animal measured was 44 cm. Females grow slightly larger than males. Newly hatched young are 3-5 cm.

Males have a concave plastron and a longer gular horn (the projecting part of the plastron under the chin), while the female's plastron is flat. The difference only becomes clear once the animal is sexually mature. In young animals the sex can only be determined reliably with a blood test that measures testosterone. The species was described by Daudin in 1802 and is the only one in the genus that lives east of the Mississippi. *Gopherus agassizii* and *Gopherus berlandieri* were formerly treated as subspecies of *G. polyphemus*.

The species is a keystone species: its large burrows are used by at least 360 other animal species, including snakes, frogs, mammals, owls and many invertebrates, and some of them cannot live without the burrows.

Distribution and habitat

Gopherus polyphemus lives on the coastal plain of the south-eastern USA: in southern South Carolina, Georgia, all of Florida, southern Alabama, Mississippi and south-eastern Louisiana. Most animals are found in northern and central Florida and southern Georgia. Populations have declined sharply across the range, most in the western and northern parts. The type locality is the area around Savannah in Georgia.

The species is protected throughout its range. West of the Mobile and Tombigbee rivers, in Louisiana, Mississippi and western Alabama, the population is also listed as threatened on the US federal list.

> **Native range:** United States.

HABITAT

The species lives in dry upland areas with well-drained sandy soil: in longleaf pine woodland on sandhills, in scrub, dry prairies, coastal dunes, dry oak scrub and flat pine woodland. It can also live on pasture, old fields and grassy roadsides. The habitat must have loose sandy soil for burrows, herbs to eat and open, sunny patches for basking and egg-laying. Natural fires keep the woodland open and promote the herbs.

Life revolves around the burrow, which is dug with the forelimbs and has only one opening. The burrow is on average about 5 m long and 2 m deep, but can reach 12 m in length and 3 m in depth. The width corresponds roughly to the shell length, so the animal can turn round anywhere. Temperature and humidity in the burrow are almost constant all year, and the burrow protects against heat, cold, drought and fire. The animal can spend up to 80% of its time in the burrow. Each tortoise has several burrows and a small home range, but the animals live in colonies. Activity is greatest in spring and summer.

The animal is a herbivore that eats over 300 plant species, mainly broad-leaved grasses and legumes; grasses make up about 80% of the food in adults. In wetter periods it eats more fruit, for example berries. It occasionally eats fungi, insects, carrion and bones, especially females before and after laying. Most of its water comes from food, and the animal only drinks open water during drought. Young animals eat more legumes than adults.

Read more: Humidity, misting and ventilation

Care

THE ENCLOSURE

Little has been published about keeping *Gopherus polyphemus*. The care advice rests on the habitat and on the closely related *Gopherus agassizii*, which has the same burrowing way of life. Temperatures, humidity, UVB zone, health and the rearing of young are borrowed from it or from tortoises from Mediterranean climates such as *Testudo hermanni*.

The species belongs outdoors in a large area, and the animal should go out whenever possible, as soon as it is above about 21 °C and sunny. The enclosure must be sunny and well drained, with grass and herbs, shelter, shade and a dry hide against rain. It can never be too large. The walls must be opaque, at least 40 cm high and extend well into the ground, because the species digs. Keep dogs and other predators out. Part of the ground must be deep, loose sandy soil where the animal can dig in, and there must be an artificial burrow: a pipe or a box with soil on top, about an arm's length deep and with an opening slightly wider than the animal's shell, provides a cool, humid microclimate of about 21-26 °C and up to 80% humidity. A small greenhouse or cold frame with a heat lamp gives warmth on cool days. Cold, wet days are the greatest risk in a cool northern European climate.

Indoors, in cold periods and in winter, an open tortoise table is best. The length should be at least 8 times and the width 4 times the shell length. For an animal of 25 cm that gives 200 × 100 cm with sides of about 40 cm; for larger animals and more animals, add more space. The substrate is at least 20 cm of a dry mixture of sand and loam without fertiliser, so the animal can dig in, with a hide or an artificial burrow at one end. Avoid fine sand and small stones, which the animal may eat. A glass terrarium is unsuitable.

Read more: Lighting and UVB

TEMPERATURE

By day the temperature should be 24-30 °C, with a basking spot of 32-36 °C under a heat lamp, measured on the substrate. At night 18-22 °C is suitable, and the heat is switched off. The animal basks until its shell is above 32 °C before it goes out to feed and dig. Always provide a cooler place and shade, so the animal can get away from the heat, and keep the burrow cooler than the basking spot.

Whether the species should have a winter dormancy in captivity is not documented, so the fact box gives none. Winters in the range are mild, and the animal retreats into its burrow when it is cold; activity peaks in spring and summer. Keep the animal active indoors in winter with warmth, light and food, and let the night sit at the cool end of the range. Use radiant heat or halogen lamps with a thermostat, and check the temperatures with a min/max thermometer.

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

HUMIDITY AND WATER

The species needs a relative humidity of 40-70%, and in the burrow it can be up to 80%. Keep the surface dry, but make the burrow more humid by putting damp soil and leaves at the bottom. The animal must be able to drink at least every 8 days, and more often if it does not have a burrow; provide a shallow, stable dish of clean water, changed daily and placed in the shade, and a lukewarm bath once a week. The animal gets part of its water from fresh herbs and grass.

LIGHTING AND UVB

The species is diurnal and basks a lot. Sunlight is best, and the animal should be out in the sun as often as the weather allows. Indoors there must be UVB lighting with a UV index of 2.0-3.0 at the basking spot (Ferguson zone 3). Ordinary full-spectrum lighting does not give enough UVB, and glass and Perspex block UVB. Fluorescent tubes lose output and must be replaced regularly. The light follows the season, at about 12-14 hours a day.

FEEDING

G. polyphemus is a grazer, and grass makes up about 80% of the diet. Give grasses and broad-leaved herbs such as dandelion, plantain, clover and other legumes, preferably from a lawn or meadow free of fertiliser and pesticides, and let the animal graze in the enclosure. Supplement with leafy greens such as endive, escarole, kale and romaine lettuce, and keep spineless cactus pads (opuntia) as an extra. Fruit should only be given rarely. Do not give soya, tofu or animal protein, and keep prepared food a small part of the diet.

The animal has a high calcium requirement: leave a cuttlebone within reach, or dust the food with calcium carbonate without phosphorus. Do not use calcium with D3 if the animal is outdoors. With a varied diet of grass and wild plants, multivitamins are not necessary. Serve the food on flat stones, so the beak is worn down and the animal does not eat the substrate. Indoors, adults are fed every other day and young animals every day.

Read more: Calcium, vitamins and supplements

BEHAVIOUR AND HANDLING

The animal is solitary and spends most of its time digging, eating and basking. In the wild the animals live in colonies with closely spaced burrows, and some females repeatedly visit the same female's burrow. Males are aggressive towards each other during the mating season, and the one that is flipped can end up helpless on its back. Keep only one male in each enclosure. The animals are kept singly or as pairs, and in a large enclosure a male can be kept with a female. Do not keep them with other tortoises.

Handle the animal as little as possible. Close contact can spread disease between animals. Never tether the animal, and never drill holes in the shell.

Breeding

SEXUAL MATURITY AND SEXING

Males have a concave plastron and a longer gular horn, and the female's plastron is flat; the difference is only clear in sexually mature animals. Males become sexually mature after 9-12 years and females after 10-21 years, when the shell is about 23 cm long; the time varies with food and climate, and it is faster in captivity. The species can live for more than 60 years, and a few animals in captivity are over 100.

MATING

The animals mate from April to June, and males sometimes try as late as late summer and autumn. Males travel far to seek out the females. Give the female many hides so she can get away from the male, and keep the males apart because they fight.

EGG-LAYING AND CLUTCHES

The female usually lays one clutch a year of 3-15 eggs, in May and June. Clutch size follows the female's size. The eggs are laid in the sand apron at the entrance to the burrow or in a sunny spot nearby. Give the female at least 25 cm of deep, loose, sandy soil in a sunny, well-drained spot.

INCUBATION

The eggs are incubated at 30-31 °C and hatch after 60-90 days. In the wild incubation lasts 80-90 days in Florida and over 100 days in Georgia. Sex is determined by temperature: above 30 °C the young become females, below that they become males. The substrate and humidity in the incubator are not documented for the species; use moist vermiculite as for other tortoises, and do not turn the eggs. In the wild about 90% of clutches are lost to predators.

Read more: Incubating eggs

REARING THE YOUNG

The young are 3-5 cm at hatching. They can be kept several together in shallow boxes with hides, fed daily with finely chopped mixed greens and given water twice a week. The shell stays soft until they are 6-7 years old and hardens with food, sunlight and calcium. Give them 24-32 °C by day and 21-24 °C at night with a cooler end, UVB and dry, clean substrate without calcium sand, and shade if they are outdoors. Dust calcium over the food twice a week. Do not keep them with larger animals.

Health and common mistakes

The greatest health risk is respiratory infection, especially upper respiratory tract disease, which is highly contagious and threatens wild populations. The signs are a runny or bubbly nose, loss of appetite and gasping. The disease cannot be cured, and animals can carry the infection without showing signs. A sick animal must be kept apart from other tortoises, and indoors away from flies.

- Dehydration: an enclosure that is too dry and hot, and a lack of water. Provide baths and a more humid burrow.
- Misshapen shells (pyramiding): too little UVB and calcium, a substrate that is too dry and food that is too rich.
- Parasites: have a vet test the droppings, especially in newly acquired animals. Some wormers such as albendazole and ivermectin can be dangerous to tortoises, so let a vet with experience choose the treatment.
- Cold and damp: respiratory infection, especially outdoors on cool autumn and spring nights.

Weigh the animal regularly; sudden weight loss is often the first sign of illness. Contact a vet with experience of tortoises if the animal is not eating, is losing weight or has loose droppings. A new animal must be quarantined before it is placed with other tortoises. Never release captive animals, because they can spread disease to wild populations.

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.