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ANGUIDS

Gila Monster

Heloderma suspectum

Heloderma suspectum is a sturdy, slow-moving lizard from the deserts of the south-western USA and north-western Mexico, black with pink or yellow bands and covered in bead-like scales. It is venomous: a bite is a medical emergency, and the species requires experience, firm routines and safe handling. It grows to 35-55 cm, burrows, feeds on eggs and small vertebrates and can live for over 20 years.

Family: Helodermatidae

KEY FACTS

THE ANIMAL

Adult size	**35-55 cm** total length incl. tail
Weight	**500-800 g**
Lifespan	**20-30 years**
Active	**By day and at dusk**
Lifestyle	**Rock-dwelling, terrestrial and burrowing**
Habitat	**Desert, semi-desert and rocky terrain**
Difficulty	**Expert**

CARE

Min. enclosure	**150 × 70 × 50 cm** L × W × H for 1 adult
Temperature, day	**22-32 °C**
Temperature, night	**20-24 °C**
Humidity	**40-60%**
Water	**Water dish**
UVB	**Recommended** Ferguson zone 2
Winter rest	**10-15 °C** 13-17 weeks
Diet	**Vertebrates**
Kept	**Singly or in pairs**

BREEDING

Reproduction	**Egg-laying**
Sexually mature	**36-60 months**
Clutch size	**3-7 eggs**
Clutches per year	**1**
Incubation	**134-155 days** at 26-29 °C

PROTECTION AND PAPERWORK

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

About the species

WARNING: *Heloderma suspectum* is venomous. The venom is produced in modified salivary glands in the lower jaw and runs along grooves in the teeth into the wound while the animal holds on and chews. There is no antivenom. A bite causes severe, burning pain, swelling, dizziness, nausea, sweating and a drop in blood pressure, and in rare cases swelling of the mouth and throat, shock and disturbances of the heart rhythm. A bite is a medical emergency, even when it looks harmless. The animal is slow and rarely aggressive, but it bites hard and does not let go. Bites are almost always caused by careless handling of an animal that seems tame. Keep this species only if you are willing to take it seriously every single day: the section on behaviour has the safety rules, and the section on health explains what to do after a bite.

Heloderma suspectum is a heavy, short-legged lizard with a broad, flat head, small eyes, powerful forelimbs with large claws and a short, thick tail that stores fat. The scales on the head, back and tail are small and bead-like, and each has a small bony plate (osteoderm) inside; the belly has none. The pattern is black with pink, orange or yellow bands and spots. The tongue is forked and dark and is used to follow scent trails. Juveniles have a simpler and less colourful pattern that changes a great deal during the first months.

Adults measure 26-36 cm from snout to vent and reach 35-55 cm including the tail. They typically weigh 550-800 g. Two subspecies have been described: *H. s. cinctum* in the northern part of the range keeps the juvenile's crossbands for life, while *H. s. suspectum* further south develops a more marbled pattern as an adult. Genetically the difference between them has not been confirmed. The species was described in 1869 by Edward Drinker Cope. The species name means "suspected", because Cope suspected the animal of being venomous, and the genus name means "studded skin", after the scales.

The species is slow and spends most of its life hidden. It has one of the lowest resting metabolic rates among lizards and gets by in the wild on a few large meals a year. In captivity it often becomes so calm that it takes food from tweezers, and this is exactly what makes keepers relax their caution. The female sheds her whole skin shortly before laying, often with the dorsal skin in one large piece. The genus *Heloderma* has the most developed venom apparatus among lizards. A compound from the venom, exendin-4, is the basis for a group of drugs for type 2 diabetes.

Distribution and habitat

Heloderma suspectum lives in the south-western USA and north-western Mexico: south-western Utah, southern Nevada, south-eastern California, Arizona and south-western New Mexico, and on southwards through Sonora to northern Sinaloa. No records are known from Baja California. The core area is the Sonoran Desert, but the species also occurs in parts of the Chihuahuan and Mojave Deserts.

H. s. cinctum lives in the northern part of the range (southern Nevada, south-western Utah and western Arizona), while *H. s. suspectum* occurs further south and east.

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

HABITAT

The species lives in desert and semi-desert with cacti, shrubs and tufts of grass, in scrub and, at higher elevations, in oak woodland. It prefers rocky slopes, dry riverbeds and canyons and shelters in burrows, thickets and under stones, where the microclimate is cooler and more humid than the surroundings.

The animal spends about 90 % of its life underground. In spring and early summer it is most active in the morning and changes shelter every 4-5 days; in midsummer it is less often seen and may be active on warm nights and after rain. Active animals have a body temperature of around 30 °C. Brumation lasts from October to the beginning of March, and in the shelter the body temperature can fall below 10 °C.

The summer rain is important. The species cannot get by on the fluid in its prey but must drink free water, and it can store water in the bladder and draw it back into the body in dry periods. The eggs are laid in summer in an earth burrow. The hatchlings emerge in late autumn and stay in the nest until the following spring without coming up.

Read more: Brumation and the seasons

Care

THE ENCLOSURE

An adult needs an enclosure of at least 150 × 70 × 50 cm (length × width × height). The size is an estimate based on the animal's size and way of life. Floor area is the most important, because the species digs for hours and turns the furnishings upside down; height matters less, although the animal can climb on rough surfaces. The enclosure must be completely secure and have a lock, so that the animal cannot get out and children and unauthorised people cannot open it.

The substrate is at least 10 cm of sand or a diggable mixture of sand and soil, with a dry part and a corner that is kept slightly damp. Newspaper, bark and wood shavings are unsuitable. Provide hides at both ends (half pipes, cork, flat stones) and flat sandstone, which wears down the claws. Stones and hides are placed directly on the floor or fixed in place so that the animal cannot dig under them and get them on top of itself. A heavy, flat water bowl that cannot be tipped over is essential. Large, ball-shaped artificial plants work as enrichment, because the animal pushes and rolls them around.

Arrange the enclosure so that feeding and cleaning can be done without hands near the animal's head. Use long tongs for cleaning, and never put your hands in while the animal is out. Remove soiled substrate continually, and replace all the substrate at regular intervals.

TEMPERATURE

By day the enclosure should have a gradient from 22 °C at the cool end to 32 °C under the heat lamp, so that the animal can choose for itself. Active animals keep a body temperature of around 30 °C. At night the temperature falls to 20-24 °C. Measure the temperature in several places with digital thermometers.

From the beginning of November to the beginning of March adult animals should have a brumation at 10-15 °C, preferably around 13 °C. It fits the natural rhythm of the species and is a prerequisite for breeding. Only healthy animals in good condition brumate. Food is stopped 2-3 weeks before cooling down, while the animal is still warm, so that the gut is empty, and the day length and heat are then lowered gradually. The animal must have water throughout the brumation and be weighed along the way. Juveniles do not brumate in their first year.

HUMIDITY AND WATER

Humidity is 40-60 %, and part of the substrate is kept slightly damp so that the animal can dig into moister soil. A completely dry substrate causes problems with shedding, while a constantly wet substrate causes skin infections, so the moisture must be local.

The species must drink free water and likes to lie in the water bowl. The bowl should be heavy, flat and large enough for the whole animal, and the water is changed at least every 3-4 days and immediately when it is dirty. Juveniles are misted lightly at least every other day, because their thinner skin makes them dry out more easily.

Read more: Humidity, misting and ventilation

LIGHTING AND UVB

The species is active by day and at dusk. The light is on for 10-13 hours a day, shortest in the periods before and after brumation and off during it. UVB is recommended: a UVB spot or a UVB tube at the basking spot. Ferguson zone 2 is an estimate based on the way of life, with a UV index of around 1-2 at the basking spot and shade in the rest of the enclosure. Replace the UVB source according to the manufacturer's instructions.

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

FEEDING

In the wild the species takes small mammals, nestlings, birds, lizards, snakes, frogs and insects, and especially eggs from birds and reptiles. It eats a few large meals a year and lives off the fat in the tail and abdominal cavity. In captivity the danger is obesity, not hunger.

Offer whole, thawed mice and young rats, day-old chicks and quail eggs. Lean chicken and a little egg can be used for variety. An adult is well served by one meal every one to two weeks in the active season; give less if the tail becomes sausage-thick. Females that are to be bred are fed slightly more generously so that they have reserves for the eggs. Juveniles get one small prey item once a week. During brumation the animal does not eat.

Always use tongs of at least 30 cm, never your fingers, and let the animal release the prey itself. Whole prey covers most of the need for calcium; dust occasionally with calcium and a multivitamin.

Read more: Calcium, vitamins and supplements

BEHAVIOUR AND HANDLING

SAFETY: the animal is venomous, and the biggest mistake is to trust that it is slow and tame. A bite comes without warning, even from an animal that has taken food from tweezers for years. Follow these rules:

- Never touch the animal with bare hands. Move it with a hook or long tongs, preferably into a closed box, and use thick gloves and tongs of at least 30 cm when feeding.
- Support the animal under the chest and hindquarters if it must be lifted. Never grab it by the neck with your fingers.
- Never have the animal out of the enclosure without another adult nearby who knows what to do.
- Never handle the animal after drinking alcohol. Alcohol recurs in several of the most serious bites.
- Keep children and other pets away, and never show the animal off by letting anyone touch it.
- Have a plan before anything goes wrong: tongs and a flat object to release the animal, and what you will say when you call

112 (see the section on health).
- A bite must always be seen by a doctor, even a small one. Even a superficial, scraping bite with the front teeth can cause severe symptoms.

A threatened animal opens its mouth, hisses and turns towards the danger. It is not fast, but it can seize a hand in an instant and hold on for several minutes. That many animals become calm in captivity is a risk, not a benefit.

The species is kept singly. Males fight by lying on top of the rival and pressing it down, and females too can be aggressive towards each other. A pair can be put together in the breeding season, in a large enclosure and under supervision. Always wash your hands after contact with the animal, substrate and food, as reptiles can carry salmonella.

Read more: Quarantine and hygiene

Breeding

SEXUAL MATURITY AND SEXING

The male has a more massive, broader and taller head than the female, and the female's body is more pear-shaped behind the forelimbs. The male's tail tapers evenly, while the female's looks slightly indented at the vent. Sex is nevertheless difficult to determine externally, especially in fat animals, and the reliable method is ultrasound at a vet, preferably just before the breeding season.

Captive-bred animals become sexually mature in their third year, males often a year later; in the wild only after 4-5 years. The male must measure at least 22 cm from snout to vent and the female at least 24 cm. Breeding requires healthy, weight-stable animals, a brumation of at least three months and a female in good condition.

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

MATING

Mating follows brumation. After at least three months at about 13 °C the animals are warmed up gradually in March, and in the wild the species mates in April and May. The female is ready to mate when mature follicles make her plump, and the male must be mature at the same time, otherwise the eggs will not be fertilised. The female is put in with the male, because a male in new surroundings spends his time exploring them. He follows her scent with his tongue, and mating lasts from a quarter of an hour to about 2.5 hours. The female can reject him by biting and must be able to retreat. The animals are only put together under supervision, with tongs or a board ready to separate them.

EGG-LAYING AND CLUTCHES

The female lays 4-5 weeks after mating if she has a suitable place; in the wild this happens from the end of May to August. A clutch is typically 4-5 eggs and at most about 7. A few days before laying she stops eating, and about two weeks before she sheds her skin. She needs a dark area with deep, damp sand or soil to dig in, and without a suitable place she may retain the eggs. After laying she builds a small mound over the nest and stays there for a few days. The eggs are removed as soon as possible without being turned, because a turned egg can kill the embryo. The female is exhausted and thin after laying and needs food and peace.

INCUBATION

The eggs are incubated at 26-29 °C in a closed box with damp vermiculite or perlite, and the humidity in the boxes must be close to 100 %. Two shallow trays of water in the incubator help. Incubation takes 134-155 days, shortest at the high temperature; at a constant 26 °C it is about 140 days. Healthy eggs smell of forest soil and resist fungus well. Two to three weeks before hatching the eggs begin to collapse, and hatching itself takes place within 48 hours. The hatchlings weigh about 35 g and have the yolk sac drawn into the belly.

Read more: Incubating eggs

REARING THE YOUNG

Each hatchling is kept separately for the first week in a small box (about 20 × 12 × 12 cm) with paper, a shallow water bowl and a hide at 26 °C. After that up to five hatchlings can be put together in a larger box with soil, hides and a heavy water bowl, and after about four months they are moved in pairs to enclosures of about 60 × 40 × 40 cm.

The absorbed yolk serves as the hatchlings' first meal. Some eat after a few days, others only after two weeks. A thawed newborn mouse whose head has been dipped in egg yolk, or a quail egg, works well. After about eight weeks most take food from tongs, and one feeding a week is enough. Use thick gloves and tongs of at least 30 cm, because the hatchlings are venomous too. Mist at least every other day, and give the hatchlings food and warmth throughout the first year without brumation.

Health and common mistakes

BITE: A bite from *Heloderma suspectum* is always a medical emergency, even when the wound looks small. The venom causes severe, burning pain that begins within minutes, peaks after 1-2 hours and can last for several days. The swelling often spreads far beyond the bite site. Weakness, dizziness, nausea, vomiting, sweating, palpitations and a drop in blood pressure are common. In rare, severe cases the tongue, lips and throat swell so that breathing becomes difficult, and shock and disturbances of the heart rhythm can occur. Bites close to the trunk (abdomen, shoulder, upper arm, calf) more often have a severe course than bites to a finger, and a previous bite can make a person hypersensitive to the venom. A bite is rarely fatal for a healthy adult, but deaths do occur. There is no antivenom.

What to do:

- Get the animal off as quickly as possible. The longer it bites and chews, the more venom enters the wound. If it is only gripping a fold of skin, it can be held behind the jaws and gently pulled off. If it is holding on firmly, the grip can be loosened by pouring water over the animal or holding it completely under water, or by inserting a thin, flat object between the lower jaw and the skin and twisting it a quarter turn. Do not use fire, heat or solvents on the animal: this only causes more injuries.
- Immediately remove rings, bracelets, watch and piercings before the swelling comes.
- Keep the bitten part of the body still. A light dressing with light pressure can stop the bleeding.
- Call 112, and say that it is a bite from a venomous lizard of the genus *Heloderma*. Never drive yourself; have someone else drive if you are not collected.
- No tourniquet or constriction, no cutting, no suction, no ice, no heat and no electric shocks.

Treatment in hospital is supportive: blood pressure, pulse and heart rhythm are monitored, fluids and painkillers are given as needed, the wound is cleaned and examined for broken-off teeth, and the tetanus vaccination is updated. Most people can be discharged within a day and are well after about 2 weeks; severe cases require longer admission, and a prolonged bite to a finger can cause lasting damage.

Typical health problems in captivity:

- Obesity: the most common mistake. The tail may be round, but not sausage-thick.
- Problems with shedding when the substrate is too dry, and skin infections when it is constantly wet.
- Metabolic bone disease from too little calcium and UVB.
- Intestinal worms and other parasites, especially in new animals.
- Egg-laying difficulties in females without a suitable place to dig.
- Lack of appetite outside brumation is a sign of illness.

Find a vet with experience of venomous reptiles before one is needed, and agree in advance how the animal will be transported safely. New animals are quarantined.

Read more: Common diseases and signs of illness

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.