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CHAMELEONS

Veiled Chameleon

Chamaeleo calyptratus

Chamaeleo calyptratus is a large, robust chameleon from the mountain valleys of the Arabian Peninsula, known for the tall, helmet-like casque on its head. It breeds readily, grows fast and is hardy for a chameleon. In return it requires a tall, airy enclosure, UVB, water as dew and drips, and a life alone. Males reach up to 61 cm, and life is short: females live about 5 years, males up to 8.

Family: Chamaeleonidae Former name: *Chamaeleo calcaratus; Chamaeleo calcarifer*

KEY FACTS

THE ANIMAL

Adult size	**35-61 cm** total length incl. tail
Lifespan	**4-8 years**
Active	**By day**
Lifestyle	**Arboreal**
Habitat	**Semi-desert and savanna**
Difficulty	**Intermediate**

CARE

Min. enclosure	**60 × 60 × 120 cm** L × W × H for 1 adult
Temperature, day	**22-25 °C**
Basking spot	**27-30 °C**
Temperature, night	**13-18 °C**
Humidity	**40-100%**
Water	**No water dish**
UVB	**Essential** Ferguson zone 3
Diet	**Insects and plants**
Kept	**Singly**

BREEDING

Reproduction	**Egg-laying**
Sexually mature	**4-6 months**
Clutch size	**20-85 eggs**
Clutches per year	**1-3**
Incubation	**180-480 days** at 25-30 °C

PROTECTION AND PAPERWORK

CITES	**Appendix II**
EU annex	**Annex B**
IUCN	**Least Concern (LC)**

About the species

Chamaeleo calyptratus is a powerful chameleon with a tall, cone-shaped casque on the back of the head. The casque grows with age and reaches about 5 cm in large males. The species name comes from Greek kalyptra, veil or covering, and means veiled or covered, alluding to the very tall casque. Under the throat is a fold with long spines, and the tail can be coiled. The feet are, as in all chameleons, tong-shaped, and the eyes can move independently of each other.

Males reach 43-61 cm including the tail and are slimmer in body. Females reach at most about 35 cm, but are more heavily built. Newly hatched young are pale green and have almost no casque. With age the males acquire bands of yellow, turquoise and blue, while the females are green with white, orange or yellowish spots. The male has a tarsal spur on each hind foot, which can be seen from hatching, and this makes sexing easy. Colour changes with mood and stress: a frightened chameleon turns dark, and a chameleon signalling to a rival lights up. Females change colour through the reproductive cycle.

It is a species with a strong personality. Many animals gape, hiss and bite when they feel threatened, and others are shyer than angry. A few become calm enough to accept the hand. The species is better suited as an animal to watch than an animal to pick up.

Two subspecies have been described, *C. c. calyptratus* and *C. c. calcarifer*, the latter with a lower casque. In captivity colour morphs also exist, but this guide is about the species itself. The species is hardy compared with most other chameleons, but it is not easy: the requirements for light, humidity, amount of food and space must be met, and an animal that is fed too generously quickly becomes too fat.

Read more: Humidity, misting and ventilation

Distribution and habitat

Chamaeleo calyptratus is native to the south-western part of the Arabian Peninsula: Yemen and south-western Saudi Arabia, up to about 2,500 m elevation. The subspecies *C. c. calcarifer* is tied to south-western Saudi Arabia and possibly Yemen, while the nominate form lives in Yemen.

The species has been introduced to Florida and Hawaii, where escaped or released animals have formed breeding populations, on Hawaii especially on Maui. There it is an invasive species that eats native insects and small lizards. An animal must never be released. The map shows only the native range.

> **Native range:** Yemen and Saudi Arabia.

HABITAT

The species lives in semi-arid to tropical highlands with plateaus, mountains and valleys. It prefers the valleys called wadis: riverbeds cut down into the mountains, which fill with water in the rainy season and become overgrown with dense vegetation. Here the climate is mild, and the animals stay in trees and bushes. In the dry season the trees lose their leaves, and the animals are easy to see.

The days are warm, but the nights are cool. Inside the foliage the temperature is around 22-25 °C, and the animals tolerate both over 40 °C and temperatures down towards freezing. In the morning fog and dew lie over the valleys, and this moisture is an important water source. The animals drink droplets from the leaves and from the casque, which channels water towards the mouth. In the wild hatching is tied to the rainy season, and the young grow quickly to reach sexual maturity before the dry season sets in.

Care

THE ENCLOSURE

An adult needs an enclosure of at least 60 × 60 × 120 cm (length × width × height). This is the smallest size that makes it possible to create a usable temperature gradient and climbing opportunities above one another. Males grow large, and 120 × 60 × 120 cm is a better size. Larger is always better. Only one chameleon should live in each enclosure, females too, and even animals raised together should be separated.

The enclosure should be tall, not wide. Mesh enclosures give good ventilation and let the air change, but a pure mesh enclosure can be hard to keep humid enough in an ordinary living room. In that case cover two sides and the door with a clear or frosted panel, so that humidity at night can hold. If the enclosure stands in a warm room with dry air, it may be necessary to seal it more. Keep the air moving with a small fan, so that the air does not become stagnant.

Furnish the enclosure with an open basking area at the top and a dense, leafy zone in the middle, where the animal can sit hidden and retreat. This is the most often overlooked part of a setup: the chameleon needs a place where it can rest with most of its body hidden, and which also shields from UVB from above. Use branches of different thicknesses, vines and plants of a non-toxic species. The animals often bite the plants, so they must be non-toxic, for example pothos, ficus, hibiscus, croton and umbrella plant. No substrate is necessary. A drain in the base with a bucket underneath is the simplest way to handle the large amounts of water that constantly come into the enclosure. Place the basking branch above eye level, so that the animal can look down on the room and feel secure.

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

TEMPERATURE

The daytime temperature in the enclosure is 22-25 °C. This is an ordinary room temperature, and a mesh enclosure follows the room. The basking spot is heated by a lamp that is on for only about three hours in the morning. This gives the animal time to warm up, after which it climbs away with calm colours. The surface temperature on the basking branch should be around 29 °C, and it need not be higher. Start low, and let the animal's behaviour decide the rest.

The casque stands much closer to the lamp than the body, and this makes the species particularly exposed to burns. Use a lamp of higher wattage and hang it higher, so that the heat is gentle over a larger area. Hold your hand where the animal's head sits: the heat should feel pleasant. If the animal hangs under the lamp for over half an hour, sits right up in the mesh, or stays dark and sluggish, the basking spot is too cold. Grey, burnt patches and melted dorsal spines are signs of the opposite. Measure the temperature with an infrared thermometer.

At night the temperature should drop to 13-18 °C. This is an important part of the animal's rest, and heating at night is not necessary. Use no light at night, not even red, because the animals can see it. Too much heat and too much food give females very large, often unfertilised clutches, so a low basking spot is an advantage for them as well.

HUMIDITY AND WATER

Humidity follows a daily cycle: 40-50 % by day and 80-100 % at night. The figures are not critical, but the rhythm is important. The chameleon does not drink from a bowl, it drinks droplets. Therefore provide water as dew and rain: mist the enclosure through the last hours of the night, so that the animal wakes to droplets on the leaves, and use a drip, for example a bucket with a small hole, which runs for a couple of hours in the afternoon. A fogger running for a few hours before the light comes on raises humidity if the enclosure is closed enough. The fogger needs distilled water and should be disinfected regularly. Keep the air moving, so that it does not stand still.

All surfaces must be dry during the day. If branches and leaves are constantly wet, the animal gets sores on its feet, and bacteria, fungus and mould thrive. Do not mist the animal in the middle of the day, because many animals dislike being sprayed. Tap water leaves limescale in foggers and nozzles, so distilled water is best for the equipment. When the animal is shedding, extra misting does not help and can make the shed harder.

LIGHTING AND UVB

The species is diurnal and needs strong light. Fit a long T5 HO tube or an LED bar of 6,500 K over the whole length of the enclosure, on for 12 hours a day and off completely at night. The UVB tube alone does not give enough light, and an enclosure that is too dark is a common mistake.

UVB is essential. The chameleon makes D3 in the skin, and a UV index of about 3 at the basking branch is enough for that. This corresponds to the lower part of Ferguson zone 3; the zone is an estimate from the index. Use a T5 HO UVB tube in a reflector on top of the mesh, and place the basking branch so that the animal's back is about 15 cm below the mesh. The distance is a rule of thumb: every tube and every reflector gives a different index, so check it with a UV meter. The index falls with the age of the tube, and the tube is replaced according to the manufacturer's instructions.

Direct sunlight is strong and can overheat the animal, so use it with caution.

Read more: Calcium, vitamins and supplements

FEEDING

Chamaeleo calyptratus eats mostly insects: dubia roaches, banana roaches, crickets, locusts, silkworms, hornworms, black soldier flies and their larvae, bluebottles and stick insects. The insects must be farmed, not wild-caught, and should have been given nutritious food and water for 2-3 days before they are offered. Variety is important. The species also nibbles the leaves in the enclosure, probably as roughage that aids digestion. Fruit is not necessary and should not be given.

Young are fed every day with as much as they can eat for as long as they are growing in length. This typically lasts until 6-9 months of age. When the body begins to grow in girth and the fat pads behind the casque swell, the amount must be cut back. Adults get at most about 5 insects of suitable size every other day. The species eats anything that moves, even when full, and obesity is a serious and common disease, particularly in females, where overfeeding causes too many eggs and fat pads that can squeeze the oviduct.

Dust the insects at every meal with calcium without D3. Twice a month they are dusted with a multivitamin that contains both D3 and retinol (preformed vitamin A). Beta-carotene is not a substitute, because it is doubtful whether chameleons can convert it. The animal makes D3 itself under UVB, so no more than this should be given. When a female is clearly carrying eggs, she may eat as much as she wants for about a month and again a week after laying. After that the amount must return to normal.

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

BEHAVIOUR AND HANDLING

C. calyptratus is a shy species that often seems aggressive. When threatened it gapes, hisses, turns its body side-on and can bite. At other times it curls up, turns dark and plays dead. Let a new animal have 1-2 weeks in peace before you touch it. If it has not eaten after two weeks, go to a vet experienced with reptiles.

Handling is stressful. The best approach is to offer food with tweezers and let the animal get used to the hand. When it takes food from the hand, it can learn to walk from hand to hand. Never grab the animal and do not hold it fast. Keep movements slow, and link handling with something positive, such as a trip to a plant in a sunny window. Many animals tolerate only a little handling, and that is entirely normal.

The species is solitary. Males are territorial and must never live together, and males and females tolerate each other only when they are to mate. One chameleon per enclosure is the only way of keeping that works. The young can be fierce towards each other and must be separated early. The species does not need company.

Breeding

SEXUAL MATURITY AND SEXING

Males can be sexed from hatching: they have a tarsal spur on the hind foot, which females lack. Adult males are larger, have a taller casque and sharper colours. Females are smaller, heavier in the body and green with white, orange and yellowish spots.

Sexual maturity is reached as early as 4-6 months and a length of 20-30 cm. This is very early, and females produce and lay eggs without a male having been near. Too much food and too much heat produce oversized and often unfertilised clutches, and this is a common cause of egg-laying difficulties. Keep feeding in check, and provide UVB and calcium, so that the female can lay her eggs safely.

MATING

The species breeds readily and does not require a cold period. A receptive female has light blue spots on the back. A male that is ready shows brilliant colours, flattens his body, sways and curls the tail, and approaches the female with nods and thrusts of the chin. A willing female lets the male mate. Mating lasts from a few minutes to an hour and can be repeated several times a day.

A female that is not receptive turns black with white or yellow spots, gapes, hisses and bites. A gravid female is almost black with yellow and blue spots and firmly rejects the male. The male must then be removed at once. Put them together only under supervision, and separate them when the female rejects the male.

EGG-LAYING AND CLUTCHES

The female lays the eggs 20-30 days after mating. In the wild the clutch is about 20-30 eggs. In captivity it is typically 35-85 eggs and up to 95, because plentiful food gives large clutches. A large clutch is hard on the female, and it is therefore important to limit food and heat before she carries eggs. She lays 1-3 clutches a year.

In the time before egg-laying she eats less and looks for a place to dig. Give her a tray or a pot of moist soil or a mixture of soil and sand that can hold a tunnel. The container should be at most about 15 cm deep. The female digs a tunnel until she sits with her head just above the surface. The soil must be moist enough that the tunnel does not collapse; otherwise she digs again from the start and can exhaust herself. Provide a branch she can follow down to the tray. She fills the tunnel in again and leaves only a slight difference in the soil surface, so the eggs can be hard to find. She may dig a new tunnel and lay more eggs after about a week.

INCUBATION

Carefully dig up the eggs and place them in a closed container with a moist base of vermiculite mixed with water in a ratio of 1:1 by weight, in a layer of 3-4 cm. The eggs are laid lengthwise, half covered, with 1-2 cm between each, because they absorb moisture and swell. The lid keeps the moisture in.

The incubation temperature is 25-30 °C, and around 25-26 °C is a safe choice. The eggs are hardy, and a wide range of temperatures works. Incubation time is highly variable: 6-16 months. The embryos often go into a rest (diapause) of 60-75 days, and a rise in temperature starts development again. It is the temperature that controls this, not the humidity. Sex does not depend on temperature.

Newly hatched young need at least a day to crawl around in the container before they are moved.

Read more: Incubating eggs

REARING THE YOUNG

The young are pale green and ready to eat at once. Set up a small mesh enclosure with many plants and branches, and provide UVB and humidity as for the adults. Give small insects every day, as much as they can eat, dusted with calcium. They grow quickly. Even in the first months the young can be aggressive towards each other, and they must live separately by 4-6 months of age at the latest. It may be necessary to separate them from the very start.

The species breeds easily, and a clutch often produces 30-60 young or more. Consider where they will all live before you let a female breed, because the young quickly need to live separately.

Health and common mistakes

Most diseases are caused by errors in the setup, especially too little UVB, wrong supplements and too much food. The typical problems are:

- Metabolic bone disease, especially in young, with too little UVB, calcium and D3. Provide UVB, dusted insects and the right supplements.
- Vitamin A deficiency and vitamin A poisoning. Both cause problems with eyes, tongue and skin. The supplement must contain retinol, not just beta-carotene.
- Obesity and egg-laying difficulties in females, which can be life-threatening. They are caused by overfeeding, too high a temperature and too large clutches. Requires a vet.
- Kidney failure and gout with too little water, too high a temperature and too little humidity.
- Respiratory infections, often because of wrong humidity or stagnant air. Symptoms are sneezing, mucus in the mouth and lethargy.
- Burns, especially on the casque, from lamps that are too close. Corneal damage can be caused by UVB that is too strong.
- Sores on the feet and mould when branches and leaves are wet all day.
- Infections of the mouth, eye infections and abscesses.
- Internal parasites. Have the animal examined if it loses weight, and have a new chameleon examined before it is introduced to other animals.

A healthy animal has open, clear eyes, a sturdy body without sunken flanks, grips the branch firmly and eats regularly. Reptiles hide illness, so seek a vet experienced with reptiles if the animal does not eat, loses weight, sits dark and sluggish, has closed eyes by day or breathes with its mouth open. An annual health check is recommended.

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.