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AGAMAS

Frilled Lizard

Chlamydosaurus kingii

Chlamydosaurus kingii is a large, arboreal agamid from northern Australia and southern New Guinea. It is known for the large frill of skin around the neck, which it flares in a threat display. It reaches 60-90 cm, is diurnal and feeds on insects. In return it requires a very tall enclosure, strong heat and UVB, and it is shy and easily stressed.

Family: Agamidae Former name: *Clamydosaurus kingii*

KEY FACTS

THE ANIMAL

Adult size	**60-90 cm** total length incl. tail
Weight	**400-870 g**
Lifespan	**8-10 years**
Active	**By day**
Lifestyle	**Arboreal**
Habitat	**Savanna and dry forest**
Difficulty	**Experienced**

CARE

Min. enclosure	**150 × 75 × 150 cm** L × W × H for 1 adult
Temperature, day	**27-32 °C**
Basking spot	**38-42 °C**
Temperature, night	**23-27 °C**
Humidity	**60-70%**
Water	**Water dish**
UVB	**Essential** Ferguson zone 3
Diet	**Insects**
Kept	**Singly or in pairs**

BREEDING

Reproduction	**Egg-laying**
Sexually mature	**24-36 months**
Clutch size	**4-20 eggs**
Clutches per year	**2-4**
Incubation	**70-110 days** at 28-29 °C

PROTECTION AND PAPERWORK

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

About the species

Chlamydosaurus kingii is the only species in its genus and one of the most recognisable lizards of all. The animal has a large, broad head, long legs and a long tail that makes up most of the length. Around the neck is a frill of skin that lies like a cape over the shoulders when folded. If the animal is threatened, it opens its mouth, hisses and flares the frill into a disc that can measure about 30 cm across. The frill is held out by long, rod-shaped hyoid bones and serves as a threat and as a signal between the animals. The genus name alludes to it: it comes from Greek chlamys, cloak, and sauros, lizard.

The colour is grey, brown, orange-brown or almost black on the back and paler underneath. The frill differs in colour by origin: red in animals from the Kimberley in the west, orange in the middle and yellow to white in the east and on New Guinea. Colour says something about where the line comes from, but nothing certain about the animal's husbandry needs.

Males reach up to about 90 cm including the tail and can weigh over 800 g; females reach about two thirds as long and weigh up to about 400 g. The male has a larger frill, head and jaws. In captivity the animals can live about 8-10 years. The species was described in 1825 by John Edward Gray. Genetically the species divides into three distinct lineages along Australia's north coast, but it is still regarded as one species.

The animal is quiet and spends most of the day keeping watch from a trunk. It is shy and easily stressed, and an animal that is repeatedly forced to show the frill is harmed by it. The species is an animal to watch, not to handle, and it suits an experienced keeper with space for a very tall enclosure. Breeding in captivity requires good breeding animals and a cool rest period, and a number of animals in the trade are wild-caught, even when sold as captive-bred.

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

Distribution and habitat

Chlamydosaurus kingii lives in northern Australia and southern New Guinea. In Australia the range runs from the Kimberley in Western Australia through the Top End in the Northern Territory to Cape York in Queensland and on south to the region around Brisbane. On New Guinea the species occurs in the Trans-Fly area on both the Papuan and the Indonesian side. The animals probably reached New Guinea when sea levels were low and the island was joined to Cape York.

> **Native range:** Australia, Papua New Guinea and Indonesia.

HABITAT

The species lives in savanna and open, dry woodland, mostly eucalyptus, with a grassy floor and few bushes. It prefers higher, well-drained terrain with many tree species and avoids low-lying plains with melaleuca and pandanus. It spends over 90 % of its time in the trees, where it sits vertically on the trunk waiting for prey. It goes down only to eat, mate or change trees.

The climate has a distinct rainy season and dry season. In the rainy season the animals are most active and sit low in smaller trees. In the dry season they move higher up into large trees, reduce their metabolism and eat less. Body temperature can reach about 40 °C. In the morning and late afternoon the animal basks on the trunk, and in the hottest hours of the day it seeks shade higher up in the canopy.

Care

THE ENCLOSURE

An adult needs an enclosure of at least 150 × 75 × 150 cm (length × width × height). Height is more important than floor area, because the species is arboreal, and how high the animal can sit gives it security. A pair needs more, preferably up to 200 cm in height. Young can start in a smaller enclosure, but they grow quickly and soon need to be moved.

Furnish with sturdy branches in many thicknesses, vertical, slanted and horizontal, and place a branch or shelf at the top of the background as a basking spot. The animal sits vertically on the trunk, so at least one thick, vertical branch is important. Cover three sides of the enclosure, so that the animal can see out only from the front. An animal that feels exposed becomes shy and stressed.

The substrate is a mixture of coconut fibre, play sand and fertiliser-free garden soil in a layer of about 5 cm, which holds moisture without becoming dusty. Ventilation must be good, but not so great that the humidity disappears. Lid and doors must be lockable.

Read more: Heat and temperature Read more: Humidity, misting and ventilation

TEMPERATURE

The basking spot should be at the top of the enclosure with a surface temperature of 38-42 °C, around 40 °C as a starting point. Follow the animal's behaviour: an animal that sits on the basking spot with its mouth open all the time is too hot. The air in the rest of the enclosure is 27-32 °C, and the coolest end may drop to 27 °C. At night the temperature falls to 23-27 °C in summer and 23-25 °C in winter.

Place the heat lamps high enough that the animal cannot get close to the bulb. The frill can burn if the animal sits too close to a hot lamp for a long time. Use ceramic fittings, guards in front of the bulbs and thermostat control. In winter or in a cool room a ceramic heater can keep the air warm. Measure with digital thermometers at the top, middle and bottom, and

measure the surface of the basking spot with an IR thermometer. Too low a temperature causes poor digestion and a weak immune system.

HUMIDITY AND WATER

Humidity should be 60-70 %, and the enclosure should be misted. The species lives in a climate with heavy rain in summer and drinks water droplets. A rain system running a couple of times a day suits best. A shallow bowl on the floor is rarely used, but can be there, and a heat source under the bowl raises humidity.

Young are misted three times a day when they are fed, and adults can have a rain shower every day. A thirsty animal drinks after a few minutes of misting. Signs of dehydration are sunken eyes and loose skin that stays standing when lightly pinched. A dehydrated animal must go to a vet. Between mistings the enclosure must be able to dry out a little, so that mould does not develop.

LIGHTING AND UVB

The species is diurnal and basks, so it needs strong light over the whole enclosure and a basking spot with heat and UVB light. Fit a fluorescent or LED lamp of 6,500 K along the length of the enclosure in addition to the heat lamps.

UVB is essential. The species belongs to Ferguson zone 3, a basker in open or partial sun. A T5 HO tube of 10-12 % over the basking spot in a reflective fitting is a good starting point. Check the distance with a UV meter, and replace the tubes according to the manufacturer's instructions. The light should be on for about 13 hours a day in summer and 11 hours in winter.

Read more: Lighting and UVB

FEEDING

Chlamydosaurus kingii is an insectivore. The diet consists of crickets, cockroaches, caterpillars, silkworms and the occasional superworm. Termites and ants are the most important prey in the wild. Adult animals can be given a single newborn mouse as a treat. Fruit and vegetables are sometimes eaten and sometimes ignored; they can be offered chopped in a dish, but are not necessary.

Juveniles are fed up to three times a day with insects no larger than two thirds of the width of the head. Adult animals are fed every other day. Give what the animal eats in about 10 minutes. Dust the insects with calcium and D3 at every feeding or every other feeding. Gravid females need more feeder insects and calcium at every feeding. Obesity is a risk in adult animals that are fed too much.

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

BEHAVIOUR AND HANDLING

C. kingii is calm and sedentary in the enclosure, but shy of movements in the room. Some animals tolerate being taken out, but handling easily stresses them, and the animal may hiss, flare the frill and bite. The frill should not be provoked, because it burdens the animal.

The animals are best kept singly. A pair is possible in a large enclosure, and then they will probably breed. Two males must never be put together, because they fight and bite each other on the head. Two females of the same size usually get on well. New animals, especially wild-caught ones, must be quarantined, and a faecal sample should be examined for parasites.

Breeding

SEXUAL MATURITY AND SEXING

Males are larger and have a larger frill, head and jaws than females. The species is sexually mature at about 2 years of age, and animals of 2-3 years are the best starting point for breeding. A female must be fully grown and in good condition before mating, because laying drains her of calcium and strength; young, growing females risk egg-laying difficulties. Sex is hard to see in young animals; size and the breadth of the frill only show with age.

MATING

In the wild the species mates at the end of the dry season and in the rainy season, from October or November to February or March. The males are territorial and display the frill to each other and to the females with the mouth open.

A cool rest period of about two months in winter promotes breeding. Lower the day and night temperature by 5-6 °C and the light by about two hours gradually over 2-4 weeks, and mist only every other day. The animals become less active and eat less. Keep them under observation, and end the rest period if an animal loses weight. Afterwards heat and light are turned up again over a week, and daily misting starts mating. The female is put with the male, not the other way round, and she must be in fine condition and eat well. Monitor the animals, so that the male does not bite too hard.

EGG-LAYING AND CLUTCHES

The female lays about 45 days after mating and then about every 45 days, in all 2-4 clutches in a season. A clutch is typically 4-13 eggs, on average 6-8, and can reach over 20. In the wild she digs a shallow pit in sandy soil without shade. In the enclosure she needs a box of at least 30 × 25 × 20 cm with at least 15 cm of moist, firm mixture of coconut fibre, sand and soil at the warm end. She covers the eggs carefully, so the box must be checked often. If she lacks a suitable place, she may retain the eggs, and this is life-threatening. If she loses weight after laying, she must rest from the male for at least a month. Give calcium at every feed throughout the season.

INCUBATION

The eggs are dug up carefully and placed in a closed box with moist, but not wet, substrate, for example the same mixture as in the laying box, or vermiculite, with a couple of small air holes. At 28-29 °C they hatch after 90-110 days; in the wild it takes about 70 days and up to four months. The species has temperature-dependent sex determination: intermediate temperatures give mostly males, while both low and high temperatures give mostly females.

Read more: Incubating eggs

REARING THE YOUNG

The young are active and eager eaters and have a proportionally small frill. They are easier to look after than wild-caught adult animals. A clutch can grow up together in an enclosure of about 90 × 45 × 40 cm, as long as the animals are the same size. Feed three times a day with small insects, and mist them at every feed. The young grow quickly, and the males grow faster than the females, so calcium and UVB are essential for the bones.

Health and common mistakes

Most problems are caused by errors in the setup: too little heat, too little UVB, too low humidity and too one-sided food. The typical problems are:

- Brittle bones (metabolic bone disease) with too little UVB and calcium. Provide UVB and dusted insects.
- Dehydration with humidity that is too low: sunken eyes and loose skin. Provide rain several times a day and contact a vet.
- Parasites in stomach and intestines, especially in wild-caught animals. Have a faecal sample examined.
- Burns on the frill and head from heat lamps that are too close.
- Stress, which makes shy animals that do not eat, and a weak immune system.
- Egg-laying difficulties in females without a suitable laying site.

Contact a vet in the case of lethargy, loss of appetite, swollen joints or problems with shedding.

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.