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POISON DART FROGS

Kokoe Poison Frog

Phyllobates aurotaenia

Phyllobates aurotaenia is a diurnal poison frog of 3-4 cm from the Pacific coast of Colombia, black with two green to golden stripes along the back. Wild animals carry a deadly skin poison, but captive-bred animals are non-poisonous. The species is bold, calls loudly and is easy to breed.

Family: Dendrobatidae Former name: *Dendrobates aurotaenia*

KEY FACTS

THE ANIMAL

Adult size	**3-4 cm** snout-vent length
Lifespan	**10-20 years**
Active	**By day**
Lifestyle	**Terrestrial**
Habitat	**Rainforest**
Skin toxins in the wild	**Strong**
Skin toxins in captivity	**None** Captive-bred animals. Wild-caught animals can keep their toxins for a long time
Difficulty	**Intermediate**

CARE

Min. enclosure	**60 × 45 × 45 cm** L × W × H for 4 adults
Temperature, day	**21-24 °C**
Temperature, night	**18-21 °C**
Humidity	**70-100%**
Water	**Water dish** depth 1-2 cm
UVB	**Optional** Ferguson zone 1
Diet	**Small invertebrates (springtails, fruit flies)**
Kept	**In pairs or in groups**

BREEDING

Reproduction	**Egg-laying**
Development	**Tadpoles carried to water**
Egg-laying site	**On the ground**
Sexually mature	**8-10 months**
Eggs per clutch	**8-28**
Larval period	**60-80 days** from hatching to metamorphosis
Larval diet	**Complete diet**
Parental care	**Carries the tadpoles**

PROTECTION AND PAPERWORK

CITES	**Appendix II**
IUCN	**Least Concern (LC)**

About the species

Phyllobates aurotaenia is the smallest of the genus's three most poisonous species. Adults measure 3-4 cm from snout to vent; the males grow to just over 3 cm, while the females are slightly larger and sturdier. The base colour is black, and two coloured stripes run from each side of the back past the eyes and meet at the front of the snout. The stripes can be green, golden, orange or brownish gold, and the hind legs are speckled in green, yellow, orange or blue. In enclosures a green form is seen in particular. The underside is black with blue or green spots.

The species was described by George Albert Boulenger in 1913 as *Dendrobates aurotaenia*. The name today covers two forms: a smaller one with broad stripes and a larger one with narrow stripes. The two forms are separated by a ravine but can be crossed with each other.

In the wild the skin is poisonous, and *P. aurotaenia* is regarded as one of the most dangerous poison frogs. Together with *Phyllobates terribilis* and *Phyllobates bicolor* it is one of the three species whose poison indigenous peoples in the Chocó have used for blowgun darts. The poison consists of batrachotoxin and related substances, which hold sodium channels in nerves and muscles open and can lead to paralysis and cardiac arrest. How potent the poison is in this particular species, compared with *P. terribilis*, is not documented. The frogs do not produce the poison themselves but take it up from their diet, probably beetles, millipedes and other small arthropods on the forest floor. Captive-bred animals that grow up on fruit flies and other feeder insects acquire no poison and are regarded as non-poisonous. Wild-caught animals, on the other hand, can carry the poison for a long time, so do not handle them without gloves, and always wash your hands after working in the enclosure.

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

Distribution and habitat

Phyllobates aurotaenia is found only in Colombia, on the Pacific side of the country in the Chocó region west of the Andes. The species is known from the drainage areas around the Atrato and San Juan rivers, in the lowlands and on the lower slopes of the Western Cordillera. It is also known from Valle del Cauca.

The species is assessed as Least Concern (LC) on the IUCN Red List, but the population is declining because the forest is being cleared.

> **Native range:** Colombia.

HABITAT

Phyllobates aurotaenia lives on the forest floor in humid tropical lowland forest and in forest on the lower mountain slopes, most often 60-520 m above sea level and in places up to 1,000 m. It is found in both primary and secondary forest, but not in heavily disturbed areas. Chocó is among the wettest regions in the world, so the air is warm, wet and almost free of drying out all year round.

The frog is diurnal and lives in the leaf litter. The males call from hiding places under fallen leaves or trunks, but also sit on top of the leaves from time to time. The call is a loud, bird-like, buzzing trill that is repeated in rapid notes and can last up to 45 seconds. Measurements of temperature and humidity from the species' habitats have not been documented, so the figures under care are based on experience from enclosures.

Read more: Humidity, misting and ventilation

Care

THE ENCLOSURE

A pair or a small group of *Phyllobates aurotaenia* needs a rainforest enclosure of at least 60 × 45 × 45 cm for up to 4 adults. The species is active and also uses height, so give it perches and plants to climb in.

Build up the floor with a drainage layer of clay pebbles, a fibre cloth and a damp, well-drained substrate. On top goes a thick layer of dry oak or beech leaves, which provides cover and keeps springtails and isopods alive. Plant densely, and offer hiding places of cork, roots and coconut shells as well as raised perches for the calling males. The species likes to lay eggs in narrow tubes on the ground, so place a horizontal film canister or a nutshell in the leaf litter, and also offer a Petri dish under half a coconut shell. Cover all ventilation openings with fine mesh so that fruit flies do not escape. Young frogs under about 5 months are best raised in a small, simple box with damp moss, hiding places and a shallow water dish before they are moved to the permanent enclosure.

Read more: Terrarium construction and bioactive substrate

TEMPERATURE

Phyllobates aurotaenia does best when cool. During the day it should be 21-24 °C, and at night the temperature is lowered to 18-21 °C. The temperature must not exceed 27 °C, because the genus tolerates heat poorly. The variation over the year should be small.

Do not use a heat lamp, because it dries out the enclosure. Room temperature and lighting normally provide enough warmth, and in the cold months a thermostat-controlled heating cable or a heat mat on the side of the enclosure can take the edge off. Do not place the enclosure in direct sun, and always have a thermometer with a probe down in the enclosure. No winter rest

is known.

Read more: Heat and temperature

HUMIDITY AND MISTING

Humidity should be 70-100 %. The species tolerates down to 50 % briefly if it has access to water, but low humidity without water can quickly become fatal. If the air is too dry or the ventilation too great, the frogs become shy and seek out the dampest corners, so they are seen less often.

Mist with reverse-osmosis water or rain water once or twice a day, so that plants and leaf litter get wet, and let the surface dry a little in between. A rain system or fogging system makes it easier to keep a fixed rhythm. Limit ventilation, but avoid stagnant, constantly wet air, which causes mould and bacteria.

WATER AND WATER QUALITY

A shallow water dish with 1-2 cm of water and a stone or a sloping edge, so the frogs can easily get up, is enough. The water dish gives the frogs somewhere to get moisture if the air becomes dry, and can also be used for tadpoles if the male is allowed to deposit them himself. The water depth is borrowed from the care of the genus's other species. An open water dish quickly becomes a source of bacteria, so the water is changed every day or every other day.

Use reverse-osmosis water, rain water or dechlorinated tap water. Amphibians absorb water and dissolved substances through the skin, so soap, cleaning products and cream must not come near the enclosure. Rinse equipment in clean water without soap.

Read more: Rearing tadpoles

LIGHTING AND UVB

The light is first and foremost for the plants. Fluorescent tubes or LED light of about 6,500 K give natural colours and good plant growth, and about 12 hours of light a day is usual. Incandescent bulbs and halogen lights give too much heat and dry out the air.

UVB is not documented as necessary for the species, and the frogs get vitamin D3 through the supplement on the food. If you choose a weak UVB source all the same, stick to Ferguson zone 1, and ensure dense planting and shade, so the frogs can withdraw from the light.

Read more: Lighting and UVB Read more: Calcium, vitamins and supplements

FEEDING

Phyllobates aurotaenia eats small arthropods. Juveniles take wingless *Drosophila melanogaster*, while adults readily eat larger feeder insects such as *Drosophila hydei* and very small crickets. Springtails, isopods and sifted meadow plankton are a good supplement at all ages. The species takes larger prey than many other poison frogs, so make sure the feeder insects are not only the smallest ones.

Adult frogs are fed about every other day, juveniles and young animals daily. Dust the feeder insects with a vitamin and mineral powder for amphibians. Newly bought animals may not eat for the first few days. It is an advantage to keep your own cultures of flies, and they should be running before the frogs move in.

BEHAVIOUR AND HANDLING

Phyllobates aurotaenia is diurnal and bold, but shy when young. The males call loudly, but do not fight one another like many other poison dart frogs: if two males face each other near a female, they call loudly until one withdraws. The species can be kept in a small group as long as there is enough space, and calling males on their own perches are a fine sight. When the animals become sexually mature, the mood can change, and the females may eat each other's eggs, so that there are few or no tadpoles. For breeding, adults are therefore best kept as pairs.

Do not handle the frogs. The skin is thin, and salt, grease and cream from the hands can damage it. If a frog has to be moved, coax it into a clean cup. Do not mix species or colour forms in the same enclosure.

Breeding

SEXUAL MATURITY AND SEXING

The sexes are hard to tell apart until the animals are about a year old. Females are larger and more sturdily built than males, but size is not always reliable, even in animals several years old. A calling frog is always a male, and the call often begins at 6-8 months. Often a female shows her sex only by laying eggs. Sexual maturity sets in at about 8-10 months. The surest approach is to buy several juveniles and let them grow up together, so the chance of a pair is high.

MATING

Phyllobates aurotaenia is easy to breed once the animals are sexually mature. The male calls from a hiding place under leaf litter or a trunk and lures the female to an egg-laying site. What triggers mating, beyond stable conditions and good humidity, is not documented.

If a pair breeds very busily, there is a risk that the female wears out. Remove the egg-laying sites for a period if the female loses weight or the quality of eggs and juveniles falls.

EGGS AND TADPOLES

The female lays her eggs on the ground in the leaf litter. Each clutch is 8-28 eggs. The species likes to choose a narrow tube, e.g. a film canister or a nutshell, but eggs have also been seen on a smooth, broad leaf or on a Petri dish under a coconut shell. When the eggs hatch, the male carries the tadpoles to slowly flowing water.

For deliberate breeding, remove the clutch and let the eggs develop in a closed box at about 22-24 °C, damp but not under water. The temperature is borrowed from the genus's other species. The tadpoles are best kept separately, e.g. in cups with reverse-osmosis or rain water and an Indian almond leaf. They are omnivorous and are fed good-quality fish food and dried bloodworms. Remove leftovers, and change the water often, because poor food and dirty water cause slow growth and deformities.

METAMORPHOSIS

The hatching time is not documented for *Phyllobates aurotaenia*. Development from tadpole to little frog takes 60-80 days.

When the front legs break through, the water level is lowered, and the cup is tilted so the little frog can climb onto land by itself; otherwise it can drown. It does not eat while the tail is absorbed, so wait with food until the tail is gone.

REARING THE YOUNG

The newly metamorphosed juveniles are moved to a small rearing box with moist moss, leaf litter, plant cuttings and a good population of springtails. Small boxes swing quickly in temperature, so place them away from draughts and direct sun. The first food is springtails and wingless *D. melanogaster*, always dusted with vitamins and minerals. Feed daily, and keep juveniles of the same size together. The juveniles are shy for the first months. At about 5 months they can be moved to a larger enclosure, and only then should you start thinking about putting pairs together.

Health and common mistakes

Phyllobates aurotaenia is hardy when the climate is right. Typical problems are:

- An enclosure that is too dry. Low humidity without access to water can quickly become fatal.
- Overheating. Above about 27 °C is dangerous, and the genus tolerates heat poorly.
- Deficiency diseases such as soft bones and crooked legs if the food is not dusted with vitamins and minerals.
- Bacterial and fungal infections of the skin in a wet and dirty enclosure.
- Chytrid fungus (*Batrachochytrium dendrobatidis*), a serious amphibian disease. Keep new animals in quarantine, separate from those you already have.
- Worn-out females if a pair breeds without pauses.

Captive-bred animals generally live about 10 years, and under good conditions over 20 years. Amphibians are hard to diagnose and treat, so prevention is the most important thing. Seek a vet with amphibian experience if a frog loses weight, stops eating, sits limply or develops sores on the skin.

Read more: Quarantine and hygiene

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.