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POISON DART FROGS

Anthony's Poison Arrow Frog

Epipedobates anthonyi

Epipedobates anthonyi is a small, red and striped poison frog of 19-27 mm from south-western Ecuador and north-western Peru. It is the frog that has been sold for decades as "tricolor", and it is probably the most widely kept and bred poison frog of all: hardy, bold, vocal and a prolific breeder.

Family: Dendrobatidae Former name: *Dendrobates anthonyi; Phyllobates anthonyi*

KEY FACTS

THE ANIMAL

Adult size	**19-27 mm** snout-vent length
Lifespan	**5-14 years**
Active	**By day**
Lifestyle	**Terrestrial**
Habitat	**Dry forest**
Skin toxins in the wild	**Mild**
Skin toxins in captivity	**None** Captive-bred animals. Wild-caught animals can keep their toxins for a long time
Difficulty	**Intermediate**

CARE

Min. enclosure	**40 × 40 × 40 cm** L × W × H for 3 adults
Temperature, day	**22-26 °C**
Temperature, night	**18-21 °C**
Humidity	**80-100%**
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	**5-10 months**
Eggs per clutch	**10-40**
Hatching	**9-14 days** at 22-24 °C
Larval period	**43-89 days** from hatching to metamorphosis
Larval diet	**Algae/plants and complete diet**
Parental care	**Guards the eggs and carries the tadpoles**

PROTECTION AND PAPERWORK

CITES	**Appendix II**
IUCN	**Near Threatened (NT)**

About the species

Epipedobates anthonyi is a small, compact poison frog with short, strong hind legs. Adults measure 19-27 mm from snout to vent, and newly metamorphosed juveniles are 8-11 mm. The back is dark red, brick red or brown, and across it run several oblique, yellowish-white to turquoise stripes and a long stripe down the middle of the back. Colours and markings vary greatly from locality to locality, and in the hobby the forms are kept separate under locality names such as "Santa Isabel". Females are often slightly larger and distinctly broader than males, especially before egg-laying.

The species was described by Gladwyn Kingsley Noble in 1921 as *Phyllobates anthonyi* and has also been placed in the genus *Dendrobates*. The species name honours the American mammalogist Harold Elmer Anthony, curator at the American Museum of Natural History.

E. anthonyi and *Epipedobates tricolor* were for many years confused or regarded as one species, until a genetic study in 2004 showed that they are two species, separated by a belt at least 200 km wide. The animals that have been bred in large numbers since the 1980s under the name "tricolor" are almost all *E. anthonyi*, and almost all terrarium literature on "*E. tricolor*" from before 2004 is really about this species. True *E. tricolor* only reached Europe much later and in small numbers from an Ecuadorian conservation centre. If you buy a "tricolor", ask about locality and lineage: "Santa Isabel" is a form of *E. anthonyi*, while "Cielito" is a form of true *E. tricolor*.

It was from frogs of this species, which were then called *E. tricolor*, that John Daly isolated epibatidine in the 1970s, an alkaloid that acts as a far stronger painkiller than morphine but is much too toxic to be used as a medicine. The frog does not produce the poison itself: it takes it up from its diet in the wild, and frogs from different habitats have been shown to have different amounts. Captive-bred animals lack it entirely or have very little. Wild-caught animals lose the poison only gradually and must be treated with caution. Skin toxicity is regarded as mild: the skin can irritate mucous membranes, so wash your hands and do not handle the animals.

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

Distribution and habitat

Epipedobates anthonyi lives in south-western Ecuador and north-western Peru, from about 150 to just under 1,800 m above sea level. The vast majority of records come from the Ecuadorian provinces of El Oro, Azuay and Loja, and the Peruvian ones from Tumbes and Piura. The range lies south of a belt at least 200 km wide that separates the species from *Epipedobates tricolor* in central Ecuador.

The extent of the range is estimated at under 20,000 km². The IUCN assesses the species as Near Threatened (NT), because the area is limited and the habitats are polluted by agricultural chemicals. The few recorded finds from Germany and Denmark are animals in captivity.

> **Native range:** Ecuador and Peru.

HABITAT

Epipedobates anthonyi lives in the leaf litter on the floor of tropical dry forest, especially near streams. It is also found in disturbed areas, e.g. along roads and in banana and cacao plantations, so it tolerates a certain amount of human impact. The species is diurnal and terrestrial, and the males are territorial.

The area has a distinct rainy season and dry season, and breeding follows the rainy season. The male carries the tadpoles to small bodies of water, from streams to puddles and water-filled cattle hoofprints holding less than 300 ml of water. Precise measurements of temperature and humidity in the wild are not documented; the figures under care are based on experience from terrariums.

Read more: Humidity, misting and ventilation Read more: Rearing tadpoles

Care

THE ENCLOSURE

A terrarium of at least 40 × 40 × 40 cm suits one male and two females of *Epipedobates anthonyi*. A group of 5-10 animals needs at least 60 × 60 × 40 cm, and more animals need more floor area. The species lives mostly on the floor, but also climbs, and calling males like to sit out on low leaves and stones. A planted back and side wall with small shelves gives extra space.

Build up the base with a few centimetres of LECA balls as a drainage layer, a water-permeable cloth and on top a substrate of soil, moss, coconut fibre and leaf litter. Plant densely, and use bromeliads if you like: the frogs lay eggs in the leaf axils and use them as hides and lookout posts. Roots, stones and cork provide structure, a few flat stones should be able to dry quickly, and several egg-laying sites and feeding sites are spread around the terrarium.

A glass terrarium with ventilation at the bottom front and at the top rear or side keeps the glass free of condensation, and the openings are covered with mesh that fruit flies cannot escape through.

Read more: Terrarium construction and bioactive substrate Read more: Feeder animals: keeping and breeding

TEMPERATURE

Keep 22-26 °C by day with both cooler and warmer zones, and let the temperature fall to room temperature at night, around 18-21 °C. The temperature must not exceed 27 °C for long, and above 29 °C is dangerous. The heat normally comes from the room and the lighting, possibly supplemented with a small spot of, for example, 35 W; heat mats and heating cables are rarely used.

Avoid direct sun, and measure with a digital thermometer down in the terrarium. A cooler and slightly drier period of about three months in winter with slightly less food can be given. It gives the females a break from egg laying and seems to give a longer life. It is not a proper winter rest.

HUMIDITY AND MISTING

Humidity should be 80-100 %. The species tolerates down to 50 % for short periods if it has access to water, but low humidity without water can quickly become fatal. A rain system is the easiest option: e.g. three sprays a day of 20-60 seconds. Leaves and fixtures should be dry again about an hour afterwards, and the substrate must not become waterlogged. In winter, spraying is less frequent or shorter.

A fogging system provides short periods of about 100 % and clearly increases the frogs' activity and calling. Use reverse-osmosis or rain water, so that no limescale spots form on the glass and leaves.

WATER AND WATER QUALITY

Make one or more small water holes with about 2 cm of water, e.g. saucers, drinking dishes or half Brazil nut shells that the frogs can easily climb out of. The male uses them to deposit tadpoles if the eggs are allowed to develop in the enclosure.

Use rain water, reverse-osmosis water or dechlorinated tap water. Amphibians absorb water and substances through the skin, so soap, cleaning products and hand cream must not come anywhere near. Change the water often, and scrub the dishes with hot water without soap.

LIGHTING AND UVB

The light is for the plants. Fluorescent tubes or LED bars for about 12 hours a day are enough, and the day length may vary a little over the year. UVB is not necessary for the frogs' wellbeing, but can be given as a weak supplement. If you choose it, stay with Ferguson zone 1, and provide shade.

Read more: Lighting and UVB

FEEDING

Epipedobates anthonyi is small but greedy and takes relatively large prey. Juveniles eat springtails and *Drosophila melanogaster*, and adults also take the larger *Drosophila hydei*, newly hatched crickets, firebrats, aphids, bean beetles and white woodlice. Only live, moving animals are eaten.

Feed adults 2-3 times a week in the "dry season" and more often in the "rainy season", and only as much as the frogs eat in a few minutes. That way they do not become fat, and they manage to eat the food before the vitamin powder has rubbed off. Always dust the feeder insects with a vitamin and mineral powder for amphibians, and give them good food yourself. Fixed feeding spots make it easy to see that all animals get something, and your own cultures of fruit flies and springtails ensure an even supply.

BEHAVIOUR AND HANDLING

Epipedobates anthonyi is diurnal, bold and often out in the open, and the males call with a trill, mostly in the morning and after misting. The species can be kept in pairs, in groups with one male and several females, or in mixed groups if the enclosure is large enough. The animals are, however, territorial and form hierarchies among both males and females. This leads to wrestling bouts, especially at the beginning; if space is lacking, the fights can continue until an animal is driven out completely. Provide several feeding spots and many visual barriers. At sexual maturity females may eat each other's eggs.

The species is dominant over other species and quickly eats their food, so preferably keep it in a species-only enclosure, and never mix different locality forms.

Do not handle the animals; the skin is thin and does not tolerate salt, soap and cream from the hands. If a frog has to be moved, lure it into a clean plastic tub, and wash your hands before and after.

Breeding

SEXUAL MATURITY AND SEXING

The sexes are easy to tell apart in adults: females are distinctly broader, especially before egg-laying, and males call. The animals become sexually mature at 5-8 months, and the first breeding attempts are typically seen 6-10 months after metamorphosis. The first clutches are often small and infertile. Females are most productive in the first five years and typically breed until they are 7-9 years old. The easiest way to a pair is to buy a group of juveniles and let them grow up together.

MATING

The species can breed all year round, but a cooler and drier period in winter gives a pause and a clear peak in the "rainy season", when the females may lay eggs every 1-2 weeks. Even in groups the animals form fixed pairs.

The male calls, especially in the morning. If a receptive female approaches him, he switches to a short, croaking call and runs to an egg-laying site with the female following. It can take hours and several visited sites before the pair decides. The male then grasps the female's head in what is called cephalic amplexus, deposits his sperm, and the female lays the eggs.

EGGS AND TADPOLES

In the wild 15-40 eggs are laid in the leaf litter; in the terrarium a clutch is typically 10-30 eggs, fewer in young females. The eggs are laid in leaf axils on bromeliads, on large leaves or in artificial caves such as half coconut shells on a saucer with a smooth, dried oak leaf, or in film canisters. The male waters the eggs with water he has collected in his bladder, guards them and chases other frogs away. When they hatch, the tadpoles climb onto his back, and he carries them to small bodies of water.

If you want to rear them deliberately, you remove the clutch after a few days, when the embryo can be clearly seen, and keep it in a closed box without ventilation at 22-24 °C with a little reverse-osmosis or rain water, so that the eggs are moist without being submerged. The tadpoles do not eat each other and can be reared together, but rearing them individually often gives the best results. Use reverse-osmosis or rain water with a pH of 6-7, only 1-2 cm deep for the first few days, later up to 10 cm, at 22-24 °C, preferably with a couple of oak or catappa leaves. Feed daily with flake fish food, shrimp food, spirulina, daphnia and chopped red bloodworms, and change the water as needed, e.g. weekly in communal containers and once or twice a week in small tubs.

METAMORPHOSIS

The eggs hatch after 9-14 days, at 22-24 °C after about two weeks. From hatching to metamorphosis takes 43-89 days depending on temperature and food, under good conditions normally 60-80 days.

When all four legs have developed, metamorphosis is near, even though the tail is still long, and the pale markings begin to show. The transition from water to land must be gentle: use a tilted box or a small aquaterrarium, or add stones, cork or aquatic plants that stick up out of the water, so that the small frogs can easily climb out.

REARING THE YOUNG

Newly metamorphosed juveniles measure 8-11 mm. Rear them in a small enclosure with the same climate and set-up as the adults' and a layer of beech or oak leaves to hide in; the juveniles are far shyer than the parents. For the first three days or so they live off the tail.

Feed once or twice daily for the first few weeks with springtails, small fruit flies and newly hatched crickets, always dusted with vitamin and mineral powder. After about two months feeding can gradually be reduced. It takes about eight months before the juveniles have reached their final size and colour. They can easily be reared in larger groups.

Health and common mistakes

Epipedobates anthonyi is hardy but needs clean and stable conditions. Typical problems are:

- Chytrid fungus (*Batrachochytrium dendrobatidis*), which has wiped out whole populations in terrariums. Quarantine new animals and have them tested, and disinfect equipment.
- Spindly legs: juveniles that develop weak or no front legs at all during metamorphosis. The cause has not been established, but the food, water quality and too many tadpoles in the same water are suspected. Old parent animals more often

produce deformities.

- Prolonged heat above 27 °C, which causes lethargy and loss of appetite. Over 29 °C is dangerous.
- Desiccation at low humidity without access to water.
- Parasites such as roundworms and flagellates, which cause weight loss despite a good appetite and require a faecal sample at the vet.
- Deficiency diseases and obesity from too little vitamin powder or too much food.

Contact a vet with amphibian experience if an animal is lethargic and emaciated, develops sores on the skin, or if several animals fall ill at the same time.

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.