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POISON DART FROGS

Black-legged Poison Dart Frog

Phyllobates bicolor

Phyllobates bicolor is a yellow to orange poison frog of 3-5 cm from the rainforest of western Colombia, often with black or greenish legs. In the wild it is one of the most poisonous animals known, but captive-bred animals are non-poisonous. It is bold, curious and almost always on view, and it breeds readily in the enclosure.

Family: Dendrobatidae

KEY FACTS

THE ANIMAL

Adult size	**3-5 cm** snout-vent length
Weight	**4.5 g**
Lifespan	**6-20 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	**50 × 50 × 50 cm** L × W × H for 2 adults
Temperature, day	**21-25 °C**
Temperature, night	**18-21 °C**
Humidity	**70-100%**
Water	**Water dish** depth 1-2 cm
UVB	**Optional** Ferguson zone 1
Diet	**Insects and 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	**12 months**
Eggs per clutch	**4-30**
Hatching	**13-14 days** at 21-23 °C
Larval period	**21-60 days** from hatching to metamorphosis
Larval diet	**Complete diet**
Parental care	**Guards the eggs and carries the tadpoles**

PROTECTION AND PAPERWORK

CITES	**Appendix II**
IUCN	**Endangered (EN)**

About the species

Phyllobates bicolor was described by André Duméril and Gabriel Bibron in 1841. The species name means "two-coloured" and refers to the contrast between the yellow to orange body and the black, dark blue or greenish legs.

Adults measure 3-4 cm from snout to vent, on average 37 mm for males and 40 mm for females, and a few animals reach nearly 5 cm. The females are slightly larger, but the sexes are almost the same size. An adult male weighs about 4.5 g. The skin is smooth, in some animals slightly granular on the back. The colour ranges from earthy orange to pure yellow. In most

animals the belly and limbs are black, but there are also animals in which the limbs are the same colour as the back. Young animals are brown or black and acquire their colour only as they grow. In the hobby there are, among others, the forms 'Green Leg' and 'Uraba'.

In the wild the skin contains batrachotoxin, one of the most powerful poisons in the animal kingdom, and the species is regarded as the second most poisonous poison dart frog after *Phyllobates terribilis*. The poison blocks the ability of nerves and muscles to send signals and can lead to convulsions, ventricular fibrillation and paralysis. Indigenous peoples in Colombia have used the poison from *Phyllobates* frogs for dart tips. The frog does not make the poison itself, but takes it up, or its precursors, from its food in the rainforest, and exactly which prey animals supply it has not been settled. Captive-bred animals that grow up on feeder insects therefore lack the poison and are harmless to humans. Skin toxicity is rated strong for wild animals and none for captive-bred animals.

Wild-caught animals are a different matter altogether. In the closely related *P. terribilis* it has not been settled whether wild-caught animals lose the poison gradually over several months or keep a large part of it indefinitely, and even small amounts can be life-threatening if they get into the mouth or a wound. If you are in the slightest doubt about an animal's origin, treat it as poisonous and use nitrile gloves. Buy only documented captive-bred animals.

P. bicolor has previously been confused with *P. terribilis*, and hybrids exist. In the 1980s the two species were probably consistently mixed up, so older terrarium literature about *P. terribilis* is probably really about *P. bicolor*. *P. bicolor* is recognised by its smaller size, more orange back, often black legs and belly and the male's higher call (about 2,500 Hz against 1,900 Hz). Never mix different *Phyllobates* species or colour forms.

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

Distribution and habitat

Phyllobates bicolor lives only in north-western Colombia, in the rainforests on the Pacific side of the Andes. Most recorded finds lie in the departments of Risaralda and Chocó, followed by Caldas, Cauca, Valle del Cauca and Antioquia. A few records from other countries stem from animals in captivity or misrecordings.

The species is assessed as endangered (EN) on the IUCN Red List. The greatest threats are deforestation, habitat loss and pollution, and chytrid fungus also poses a risk. A few zoological institutions and a national park project in Colombia breed the species as part of conservation work.

Read more: Quarantine and hygiene

> **Native range:** Colombia.

HABITAT

Phyllobates bicolor lives in warm and very humid tropical rainforest on the forest floor, often near small streams and puddles. The temperature rarely falls below 27 °C, and at least about 2,000 mm of rain falls per year, in many places far more, so the forest is green all year round.

The frog is diurnal and moves in short, quick hops through the leaf litter, rarely still for more than a couple of seconds. Thanks to the poison it is bold and moves about openly. It can climb in bushes and up moss-covered trunks. Most populations breed repeatedly during the rainy season, and the tadpoles are carried to small collections of water, e.g. in tree holes, bromeliads or the leaf axils of palms.

Read more: Rearing tadpoles

Care

THE ENCLOSURE

A pair of *Phyllobates bicolor* needs a rainforest enclosure of at least 50 × 50 × 50 cm. Allow about 40 litres per adult. A group of up to nine animals needs at least 70 × 70 × 70 cm. The species lives near the ground, so floor area counts most.

Furnish with a drainage layer of clay pebbles of about 5 cm, a water-permeable cloth and about 5 cm of well-draining substrate, e.g. a mix of bark, peat, charcoal and coconut fibres. On top goes a thin layer of long-fibre sphagnum and a good layer of oak or beech leaves. Springtails and woodlice in the substrate keep it clean. All openings must be covered with mesh that fruit flies cannot get through.

Plant densely with plants that tolerate heat and moisture, and provide roots, cork and flat stones as hiding places and calling spots. A well-established, planted enclosure needs only little cleaning: the substrate needs to be replaced only after 3-5 years, as long as it does not become waterlogged and smell rotten, and new leaf litter is added about every six months.

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

TEMPERATURE

During the day it should be 21-25 °C, and at night the temperature is lowered by 3-4 degrees, to 18-21 °C. The species requires lower temperatures than *P. terribilis* and tolerates short cold periods down to about 16 °C, but like all poison dart frogs it tolerates heat poorly. Above 27 °C it becomes dangerous, so avoid direct sun and powerful spotlights. The temperature needs to vary only 1-2 degrees over the year, and there is no winter rest.

Use a digital thermometer with a probe down in the enclosure. Heat mats and heating cables are normally not necessary; the warmth comes from the room and the lighting.

HUMIDITY AND MISTING

Humidity should be 70-80 % in the middle of the day and up to 100 % morning and evening. A rain system and a fogging system on timers make this easiest, and the fog clearly makes the frogs call and move about. Leaves and furnishings must be able to dry off again between mistings, and the substrate must not become boggy.

Use reverse-osmosis water or rain water, so that glass and leaves do not get limescale spots. Stagnant, constantly wet air causes mould and bacteria, so misting and ventilation must be balanced.

Read more: Humidity, misting and ventilation

WATER AND WATER QUALITY

The species appreciates a water surface in the enclosure. Provide one or more small water dishes with 1-2 cm of water that the animals can easily climb out of, or a small water section at the front glass with a drain, so that the water can be changed easily.

Use rain water, reverse-osmosis water or dechlorinated water. Amphibians absorb water and substances through the skin, so soap, cleaning products, hand cream and insecticides must never come near the enclosure. Change the water often, and scrub the dishes with hot water without soap. Tadpoles are reared in separate containers (see Eggs and tadpoles).

LIGHTING AND UVB

The lighting is first and foremost for the plants. Fluorescent tubes or LED for about 12 hours a day are enough. UVB is not documented as necessary for the species, and in the closely related *P. terribilis* no visible difference is seen between animals with and without UV light. UVB is therefore optional; if you choose it, stick to Ferguson zone 1, and provide shade. The frogs get their vitamin D3 through the supplement on the food.

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

FEEDING

Phyllobates bicolor prefers small feeder insects of no more than about 3 mm. The staple is wingless fruit flies, supplemented with very small crickets, bean beetles, springtails, woodlice, aphids, flour beetles, small waxworms, soldier fly larvae and field plankton. Adult animals also take slightly larger prey. In the wild the species lives on ants, termites, small beetles and other small arthropods in the leaf litter.

Adult frogs are fed about every other day, juveniles daily. The species eats very readily, often too readily, and easily becomes fat, so avoid overfeeding. Dust every feeder insect with a vitamin and mineral powder for amphibians, and keep your own cultures of fruit flies and springtails.

BEHAVIOUR AND HANDLING

Phyllobates bicolor is diurnal, very active and curious and almost always on view. The males call loudly with trilling, buzzing tones, sometimes for several days at a time. If another male answers, the calling male chases him away, and they can wrestle standing on their hind legs. The species does well both in pairs and in groups, but in small groups the females may fight. Pairs are recommended for breeding.

Do not handle the animals. Captive-bred animals are non-poisonous, but the skin is thin, and salt, soap and cream from the hands can damage it. If a frog has to be moved, lure it into a clean plastic tub. Wash your hands before and after working in the enclosure, and use nitrile gloves if you are not sure of the animals' origin.

Breeding

SEXUAL MATURITY AND SEXING

The sexes are almost the same size; females are slightly larger, and males are recognised by the call. The animals become sexually mature at about 12 months. The first clutches are often of poor quality and go mouldy, and females lay the most good eggs from the second to the third year. The surest way to a pair is to buy a small group of juveniles and let them grow up together.

MATING

In the wild most populations breed repeatedly during the rainy season. The male calls from a leaf or a stone, and when a female has been lured, the pair finds a moist, hidden place for the eggs. During mating the male grasps the female under the chin, because they are almost the same size, and he fertilises the eggs as she lays them.

What triggers breeding in the enclosure is not documented for the species, but a strong rhythm of rain and fog keeps the frogs active and calling.

EGGS AND TADPOLES

The female lays 4-30 eggs per clutch, and the species can be a prolific breeder. The eggs are laid in a jelly-like mass in a damp, hidden spot in the leaf litter, under stones or on plants. Provide several egg-laying sites, e.g. film canisters or half coconut shells with a small entrance. One of the parents guards the eggs, and when they hatch it sits in the jelly so that the tadpoles can climb onto its back, where they stick in mucus until they reach water.

For deliberate breeding, remove the clutch and place it in a closed box at 21-23 °C, damp but not under water. The tadpoles are best raised separately, because they eat each other if there is too little food; if they are fed 3-4 times a day, they can also be kept together. Use soft reverse-osmosis or rain water, and feed fine fish food or mixes for tadpoles. The water is changed often.

METAMORPHOSIS

The eggs hatch after 13-14 days at 21-23 °C. The larval period is about three weeks to two months depending on temperature and food, as in *P. terribilis*.

When all four legs have developed, metamorphosis is near, even though the tail is still long. Move the tadpole to a tilted tub with a lid and air holes, where 2-3 cm of water collects at one end, so that the little frog can climb onto land itself. When it has come up, it is moved to a rearing enclosure.

REARING THE YOUNG

Newly metamorphosed juveniles are brown or black and shyer than the adults, and they only acquire their colour as they grow. Keep them in a small enclosure with the same climate and set-up as the adults' and a good layer of leaf litter to hide in. For the first few days they live off the remains of the tail. After that, springtails and the smallest fruit flies are the best food, later small crickets, always dusted with vitamin and mineral powder. Feed daily, and sort the juveniles by size after a few weeks.

Health and common mistakes

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

- Chytrid fungus (*Batrachochytrium dendrobatidis*), a serious amphibian disease. Quarantine new animals, and disinfect equipment before it goes into the enclosure.
- Overheating: prolonged heat above 27 °C causes stress, and the species tolerates heat less well than *P. terribilis*.
- Obesity, because the species eats very readily. Do not feed too often.
- Deficiency diseases such as soft bones and crooked legs if the food is not dusted with vitamins and minerals.
- Mouldy eggs from young females. This often corrects itself as the female gets older.
- Parasites, which cause weight loss despite a good appetite. A faecal sample at the vet will reveal them.

In captivity the species lives 6-20 years, and a few animals live over 20 years. Contact a vet with amphibian expertise if a frog loses weight, stops eating or develops sores or discoloration on the skin. Say if the animal is wild-caught, so that the vet can take precautions against the poison.

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.