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FROGS

Blue-sided Treefrog

Agalychnis annae

Agalychnis annae is a tree frog of 6-8 cm from the mountain forests of Costa Rica: green on the back, with orange eyes and sky-blue flanks and thighs. It is nocturnal, lives high up in the vegetation and is vulnerable in the wild. The species needs a cool, airy terrarium: 20-24 °C by day with fairly dry air, and heavy misting only in the evening.

Family: Phyllomedusidae Former name: *Phyllomedusa annae*

KEY FACTS

THE ANIMAL

Adult size	**6-8 cm** snout-vent length
Lifespan	**5-10 years**
Active	**At night**
Lifestyle	**Arboreal**
Habitat	**Rainforest and montane forest**
Skin toxins	**None known**
Difficulty	**Intermediate**

CARE

Min. enclosure	**45 × 45 × 60 cm** L × W × H for 4 adults
Temperature, day	**20-24 °C**
Temperature, night	**15-18 °C**
Humidity	**50-75%**
Water	**Water dish** depth 2-3 cm
UVB	**Recommended** Ferguson zone 3
Diet	**Insects**
Kept	**In pairs or in groups**

BREEDING

Reproduction	**Egg-laying**
Development	**Tadpoles in water**
Egg-laying site	**On leaves over water**
Eggs per clutch	**47-162**
Hatching	**5-8 days** at 22-24 °C
Larval period	**60-250 days** from hatching to metamorphosis
Larval diet	**Complete diet**
Parental care	**None**

PROTECTION AND PAPERWORK

CITES	**Appendix II**
IUCN	**Vulnerable (VU)**

About the species

Agalychnis annae is a slender, arboreal tree frog. Males are 6-7 cm long and females about 8 cm, measured from snout to vent. Females are clearly larger than males and have a blunter snout, while the male's snout slopes. Weight is not documented. The back is a clear leaf green and the belly a pinkish orange, while the throat and chest are cream-yellow. The flanks, the concealed parts of the thighs and the forearms are sky blue, and the fingers, toes and webbing are deep orange. A cream-yellow stripe runs along the edge of the forearm and foot. The eyes are yellow-orange with a coppery rim, and the pupil is vertical.

At night, when the frog is active, the back is a darker green, and the flanks and thighs turn dark blue to purple. By day, while it sleeps, the back is pale green and the flanks light blue. Newly metamorphosed young are about 21 mm long. They are green on the back and have yellow hands and feet, but as yet no blue on the flanks and limbs; this appears as they grow.

Agalychnis annae closely resembles *Agalychnis moreletii*. It differs in being larger, in having orange rather than red eyes and in having blue rather than orange flanks and thighs. The two species are closely related and can be crossed in captivity, but they are regarded as two species and should not be mixed.

By day the frog sleeps on the underside of large leaves with its limbs drawn in to the body, its hands under its chin and its eyes closed, and is then hard to spot. Skin toxins are not documented in the species. Lifespan is not documented; the figure in the box is borrowed from *Agalychnis moreletii*.

Distribution and habitat

Agalychnis annae is known only from Costa Rica, where it lives in the Central Valley and on the slopes of the Cordillera Central, Cordillera de Tilarán and Cordillera de Talamanca, at about 600-1,650 metres above sea level. The total range is estimated at about 16,000 km². A single female found in 2012 at Cerro Colorado in western Panama may indicate a small population there.

Much of the forest the species lives in has been cleared, so the populations are fragmented by coffee plantations, fields and towns. The species is still fairly common in parts of the Central Valley, where it also lives in the coffee zone, but it disappeared from undisturbed forests such as Monteverde around 1980 and has been rare elsewhere since. The decline is probably linked to climate change and the fungal disease chytridiomycosis; some animals carry the fungus, but the species survives at those sites. It is listed as vulnerable.

> **Native range:** Costa Rica.

HABITAT

Agalychnis annae lives in lush, humid forest and in the coffee zone, where the daytime temperature is moderately warm and the humidity high. It is a montane species and goes higher up than most *Agalychnis* species. The frogs breed at ponds and slow-flowing streams, and the rest of the time they sit in bushes and trees. By day they sleep on the underside of large leaves near the water.

The breeding season falls in the early rainy season: the males call from branches in bushes and small trees over ponds, marshes and streams from April and some way into the summer. They call from dusk with a single, rolling note, repeated at intervals of 40 seconds to almost two and a half minutes. Males clearly outnumber females at the water. The females sit on the branches over the water, and mating takes place on a branch with the male on the female's back. The eggs are laid in irregular clumps of jelly on leaves, branches and creepers 35-250 cm above the water, and the tadpoles drop into the water when they hatch. Neither sex has been seen in the water.

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

Care

THE ENCLOSURE

There is little direct husbandry knowledge about *Agalychnis annae*, so the figures here are partly borrowed from *Agalychnis moreletii*, which lives at the same altitude in the same type of mountain forest and has the same requirements. *Agalychnis annae* lives in the vegetation, so height matters more than floor area. A terrarium of at least 45 × 45 × 60 cm holds a small group of four animals. For breeding more space is needed: at least 60 × 45 × 90 cm for a breeding group of four to six animals. The frogs jump far, so the larger the better.

Furnish with live plants with large, strong, smooth leaves that can carry the whole frog and give cover by day, for example *Calathea*, *Heliconia* and *Philodendron*. Add horizontal and vertical branches so there are sleeping places high up, and let at least one branch reach all the way down to the water bowl. A simple, easy-to-clean terrarium gives healthier animals than a deep substrate: soil and coconut fibre can harbour parasitic roundworms, so cover the floor with leaf litter, damp kitchen paper changed daily, or a capillary mat. Do not use chlorine-bleached or printed paper. Rinse nursery plants thoroughly of fertiliser and pesticides before putting them in the terrarium.

Wipe the glass when the paper is changed, because the frogs sit on the panes at night. The terrarium must be well ventilated, because stagnant, humid air causes disease.

TEMPERATURE

Agalychnis annae comes from higher-lying forests than the better-known tree frogs and does not tolerate heat for long periods. By day the temperature should be 20-24 °C, and it should not exceed 25 °C, not even briefly. At night the temperature should fall to 15-18 °C. The figures follow *Agalychnis moreletii*, which lives at the same altitude. No basking spot is used, and the heat from the lamps must not lift the terrarium above the daytime temperature.

Before breeding the temperature is lowered for a few weeks and the air kept drier (see Mating). A fixed winter rest is not documented in the species.

Read more: Heat and temperature

HUMIDITY AND MISTING

Humidity is kept at 50-75 % by day, while the frogs sleep. In the evening, when the lights go out, the terrarium is misted heavily, so that the humidity rises to 80-100 % and falls again during the night. An automatic misting system is set to give most water at night, so the terrarium can dry out during the day. Many tree frogs dislike direct misting on the body, so aim for an even dew on leaves and glass rather than a direct jet.

The frogs absorb water through the skin and drink the dew on the leaves. Persistent heat and high humidity are the most common cause of disease, so good ventilation is essential.

WATER AND WATER QUALITY

There must always be a bowl of clean water in the terrarium. A bowl about 20 cm in diameter with 2-3 cm of water is enough, and the frogs must be able to climb out easily; smooth stones in the bowl prevent smaller animals from drowning. The water is changed every day, even if it looks clean, because the frogs often urinate in the bowl, and the bowl is scrubbed free of deposits.

Use dechlorinated water filtered for heavy metals, or reverse-osmosis water with minerals added back, but never pure reverse-osmosis water. Do not use soap or detergents on the bowl.

LIGHTING AND UVB

UVB is recommended, because vitamin D is necessary for calcium metabolism, and insects contain almost none. Ferguson zone 3 is borrowed from *Agalychnis moreletii*: an average UV index of 1-2.6 at the places where the frogs rest. Create a gradient with branches and leaves so the frogs can choose for themselves how much UVB they get, and measure the output of the lamp regularly. Too little UVB causes bone disease, too much damages eyes and skin.

A UVB fluorescent tube (T5) can be combined with LED plant lighting, which gives both plant growth and UVA. Halogen spots give both UVB and heat and are used only with caution, because they quickly dry and heat the terrarium.

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

FEEDING

Agalychnis annae eats only insects. Brown crickets are the best staple food when they have been fed a nutritious diet for a couple of days before the frogs get them. Cockroaches, waxworms and houseflies (and their larvae) are also taken. Small nymphs suit young animals; feeder insects that are too large cause cloacal prolapse. Newly metamorphosed young get 2-3 large fruit flies (*Drosophila hydei*) as their first meal.

An adult frog gets a couple of crickets of about 20 mm two to three times a week. Feed in the evening, just before the frogs become active, and remove uneaten insects the next morning so they do not gnaw at the sleeping frogs. Dust the food alternately with calcium and a vitamin and mineral supplement of known composition. A feeding dish up among the branches keeps the insects in the powder and away from the floor. Live food must not fall into the water bowl.

Read more: Feeder animals: keeping and breeding

BEHAVIOUR AND HANDLING

Agalychnis annae sleeps on leaves by day and is active at night. It moves slowly and climbs hand over hand, but jumps far when frightened, so open the terrarium carefully. In the wild the males are not territorial: calling males sit side by side a few centimetres apart.

In the terrarium the frogs can be kept in a group of both sexes or of the same sex when there is enough space. The frog can share a terrarium with other species that have the same temperature and humidity requirements, but day-active species can stress a nocturnal frog, and large crickets can stress small species. *Agalychnis annae* and *Agalychnis moreletii* are not kept together, because they can be crossed.

The frog is handled only when necessary, and preferably with damp, powder-free disposable gloves.

Breeding

SEXUAL MATURITY AND SEXING

Females are clearly larger than males (about 8 cm against 6-7 cm) and have a blunter snout. Males have a sloping snout and a large, horny nuptial pad on the thumb. The age at sexual maturity is not documented.

MATING

Breeding is based on a dry period of four to five weeks with slightly lower humidity and cooler nights, followed by a distinct, sudden rainy period. The frogs are moved to a rain chamber, where the rain is switched on in the evening and off during the day; a terrarium with a drain makes it easier to supply large amounts of water. The figures for cooling and rain are borrowed from *Agalychnis moreletii*: the daytime temperature is lowered for a few weeks to about 21 °C and the night temperature to 12-13 °C, and when the females are full of eggs and the males have nuptial pads, they are moved to the rain chamber. Here the water at the bottom is kept cold (15-18 °C) for up to three days without rain and then warmed to 22-24 °C as the rain is switched on.

The males call as soon as the humidity rises at night, and mating takes place on a branch over the water. In the wild males clearly outnumber females, so several males per female helps. The rain chamber is used for one week at most at a time, and the frogs are not fed there. If nothing happens, the frogs are moved back to the dry, cool terrarium.

EGGS AND TADPOLES

The eggs are laid on leaves, branches or the glass over the water in irregular clumps of jelly. A clutch is 47-162 eggs, on average about 106. The jelly is clear, and the individual eggs are visible. In the first days the yolk is pale green and the animal pole brown. There is no parental care.

Leave the eggs in place until the tadpoles hatch, and collect the tadpoles by placing a water container under the leaf. The leaf can also be cut off and placed in a plastic container with a little water at the bottom, so the eggs are not completely covered; if the leaf is on a stalk, it can be hung over the water. It does not matter if a few eggs slide into the water.

METAMORPHOSIS

The eggs hatch after 5-8 days at about 22-24 °C; in the wild it takes about six days. The tadpoles wriggle out of the eggs and fall or slide into the water. The clump is not disturbed while the eggs develop.

The tadpoles live free in the water column and are raised in an aquarium with fine sand, aquatic plants such as waterweed and duckweed, and a sponge filter with a gentle current. Up to 30 tadpoles can be kept in an aquarium of about 40 litres if the water is kept clean; change 25-30 % of the water each week. For the first weeks they are fed finely powdered fish food twice a day, then flake food and freeze-dried tubifex. The water temperature is kept at about 22-24 °C.

The larval period is not known in the wild, but wild tadpoles are well advanced in development within just under three months. Under laboratory conditions metamorphosis can drag out to about 250 days, so the time varies a great deal. In *Agalychnis moreletii* the tadpoles metamorphose after 60-100 days. When all four legs have appeared, the young are moved to a container with a sloping leaf they can climb onto, and no more than 1 cm of water. They do not eat until the tail has been absorbed.

REARING THE YOUNG

When the tail is completely gone, the young are moved to a small, clean terrarium with branches and leaves and damp kitchen paper as the floor, changed daily. The first meals are 2-3 large fruit flies (*Drosophila hydei*), and after a week or two nymphs of brown crickets of 3-6 mm can be offered. Do not give too many flies at a time, because newly metamorphosed young are easily stressed by many feeder insects, and feeders that are too large cause cloacal prolapse. The first weeks are the most vulnerable time; after that rearing is straightforward. Mist daily and feed every other day. The young have no blue on the flanks and limbs; it appears as they grow.

Health and common mistakes

Diseases and husbandry errors in *Agalychnis annae*:

- Too warm and too humid: most health problems arise when the temperature or humidity is too high for long periods. Keep the daytime temperature at 24 °C at most, and let the air dry out by day.
- Roundworms (for example *Rhabdias*): tree frogs are very susceptible, and the worms multiply in soil and dirty water bowls. Keep the terrarium clean, and change paper and water daily. Treatment must be carried out by a vet with amphibian expertise, because some products are lethal to tree frogs.
- Cloacal prolapse: most often occurs when young frogs are given too many large feeder insects.
- Snout abrasions: occur when the frogs jump against glass or mesh in terrariums that are too small or too restless.
- Egg binding: a female that starts to lay but is disturbed, or where the rain stops halfway, can retain the eggs, and this can poison her. Egg-bound females must go to a vet.
- Bone disease from too little UVB and calcium. Dust the food with calcium, and measure the UVB lamp.
- Chytrid (*Batrachochytrium dendrobatidis*) is a fungal disease that is deadly to amphibians and can be carried by animals without symptoms. The species is particularly hard hit in the wild. Quarantine new animals.
- Animals that will not eat or have sores or swellings must go to a vet with amphibian expertise.

Read more: Quarantine and hygiene 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.