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FROGS

Hill Garden Bug-eyed Frog

Theloderma asperum

Theloderma asperum is a small, nocturnal tree frog from the forests of South-East Asia. It is blackish brown with white warts that resemble bird droppings, and has deep ruby-red eyes. The species tolerates more heat than the other members of the genus and thrives in a small, humid terrarium with a water section. It calls quite loudly and is best kept in a small group.

Family: Rhacophoridae Former name: *Philautus asper*

KEY FACTS

THE ANIMAL

Adult size	**3-4 cm** snout-vent length
Lifespan	**5-10 years**
Active	**At night**
Lifestyle	**Arboreal and semi-aquatic**
Habitat	**Rainforest and montane forest**
Skin toxins	**None known**
Difficulty	**Intermediate**

CARE

Min. enclosure	**45 × 45 × 45 cm** L × W × H for 4 adults
Temperature, day	**20-24 °C**
Temperature, night	**17-21 °C**
Humidity	**75-95%**
Water	**Water section** depth 5-10 cm
UVB	**Optional** Ferguson zone 1
Diet	**Insects**
Kept	**In pairs or in groups**

BREEDING

Reproduction	**Egg-laying**
Development	**Tadpoles in water**
Egg-laying site	**On leaves over water**
Sexually mature	**6-10 months**
Eggs per clutch	**4-15**
Hatching	**7-14 days**
Larval period	**75-180 days** from hatching to metamorphosis
Larval diet	**Complete diet**
Parental care	**None**

PROTECTION AND PAPERWORK

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

About the species

Theloderma asperum is one of the smallest frogs in its genus. Adults measure 3-4 cm from snout to vent, with females slightly larger and rounder than males. The back is dark with white, warty areas, and the young animals carry a distinct white or grey spot in the middle of the back. This gives the frog the look of bird droppings, which is an effective protection against predators. The eyes are deep ruby red, the toes have adhesive discs, and unlike other species in the genus it lacks teeth in the palate. The genus name *Theloderma* comes from the Greek *thele*, nipple, and *derma*, skin, and it is precisely the knobbly, warty limbs and the rough skin that characterise the frogs of the genus.

Newly metamorphosed young are small, smooth and light brown, and only with age do the contrasts and warts appear. The sex ratio is fairly even, even when the tadpoles grow up at room temperature, and this is unusual in the genus. Males have a red nuptial pad on the inside of the forelimbs, which is swollen in the breeding season, and call with a soft, owl-like hooting. The call is quite loud, so think before placing the terrarium in the living room or bedroom.

Lifespan is not documented. The animals can live more than five years in captivity, and for the genus about ten years is assumed. The species is still rare in the hobby.

The delimitation of the species has been confusing, because it closely resembles *T. albopunctatum* and *T. baibungense*, and only the records from the area in Malaysia where the species was described are certain. The skin is sensitive, as in all amphibians, and no toxic skin secretion has been described. Even so, wash your hands before and after contact, and avoid handling the frogs.

Read more: Rearing tadpoles

Distribution and habitat

Theloderma asperum was described from peninsular Malaysia, and only the records from there are entirely certain. The species has also been reported from Thailand, Myanmar, north-eastern India, Bangladesh, Bhutan, Vietnam, Cambodia and Sumatra, but several of the records may conceal confusion with closely related species, so the precise range is uncertain.

The animals in the terrarium hobby derive from animals collected in Vietnam. The species is bred in captivity, and captive-bred animals are far preferable.

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

> **Native range:** Malaysia, Thailand, Myanmar (Burma), India, Bangladesh, Bhutan, Vietnam, Cambodia and Indonesia.

HABITAT

Theloderma asperum lives in tropical lowland and montane forest from sea level up to about 1,500 metres. The frog sits on low plants and stumps and is so well camouflaged that it is very hard to spot. It probably spends much time in water-filled tree holes. This is also where it lays its eggs, above the water in cavities in dead trees, so that the tadpoles fall into the water when they hatch. It also breeds in rainwater puddles and water-filled objects. The water in the tree holes is often nutrient-rich and full of insect larvae, and the tadpoles grow quickly, so that they manage to metamorphose before the hole dries out.

The climate is warm and humid. The species tolerates higher temperatures than the montane species in the genus, but it too runs into problems with heat above 27 °C. It is listed as Least Concern (LC), but forest loss and logging are the greatest threat to the habitat.

Care

THE ENCLOSURE

Theloderma asperum is small and can be kept in a relatively compact terrarium. A terrarium of 45 × 45 × 45 cm (length × width × height) is suitable for a small group of four animals. The frog is arboreal and likes to sit at the water's edge, so the height should be used.

The furnishings imitate a tree hole and a damp forest floor: cork tubes and cork sheets placed vertically and at an angle above the water, branches, mangrove wood and plants such as pothos, peace lily and low ferns. Cork tubes with an inner diameter of at least 8 cm, standing partly in the water, are the preferred egg-laying sites and are also used as hides outside the breeding season. Keep the substrate moist with a layer of moss and leaves, and provide an easy route from water to land, so that newly metamorphosed young can climb out. The lid must be tight enough to hold the humidity, but have ventilation, so that the air does not stand still. New animals go into quarantine for six weeks.

Read more: Humidity, misting and ventilation Read more: Quarantine and hygiene

TEMPERATURE

By day the temperature should be 20-24 °C, and at night 17-21 °C. The species tolerates down to about 10 °C briefly and manages 24-25 °C without problems, but above 27 °C it becomes dangerous and can be fatal. Measure with a digital thermometer, and keep the terrarium away from south-facing windows and heat sources. Heat lamps do not belong.

In summer, misting with cold water, ice cubes of reverse-osmosis water in the water section or a small fan in front of the terrarium helps. The species does not need a winter rest.

HUMIDITY AND MISTING

Humidity is kept at 75-95 %. The species tolerates short periods down to about 50 % if there is access to water, but dry air without water can quickly be fatal. Mist every day with cold water, and make sure the water section and the substrate are always moist. A misting system is practical, because it also cools the terrarium. The air must not stand still, so a light draught through the ventilation is necessary.

WATER AND WATER QUALITY

The frog spends much time at the water's edge and even sits under water, so the water section is not for decoration. Provide a permanent water area 5-10 cm deep with cork sheets and cork tubes, so that both adults and young can easily climb out. Use reverse-osmosis water remineralised with a supplement for amphibians, and add tannin with oak leaves or leaves of *Terminalia catappa*, so that the water takes on a tea-brown colour. A filter is not necessary when the water is changed regularly: change about half every week. Rinse your hands free of soap and cream before touching the water, and never use cleaning products in the terrarium. Drowned feeder insects are removed daily.

LIGHTING AND UVB

The frog is nocturnal and has no documented need for UVB. A weak UVB tube for shade-dwelling species (Ferguson zone 1) can be used and is optional, but then the frogs must always be able to retreat into shade. Live plants need plant lighting, for example a T5 tube of 6,500 K for 12 hours a day. The light must not heat the terrarium. A dim red night light or a moon lamp makes it possible to see the frogs when they are active.

Read more: Lighting and UVB

FEEDING

T. asperum eats insects. Small crickets are the most important food, supplemented with wax moth larvae, flies, springtails for the smallest young, small dubia cockroaches and soldier fly larvae. Feeder insects must be at most as long as the distance between the frog's eyes: about 3 mm for newly metamorphosed young and up to 12 mm for adults. Dust the food with a good vitamin and mineral supplement, alternating calcium with D3 and a multivitamin.

Feed just after the light has been switched off, and place the crickets in a small, floating feeding dish, so that they do not drown and foul the water. Adults get four to six feeder insects two to three times a week. Females are always close to laying eggs and need a little extra food and calcium.

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

BEHAVIOUR AND HANDLING

Theloderma asperum is nocturnal and by day sits hidden in tubes, between plants or close to the water. It does well in a group as long as there is enough space, and it readily breeds in pairs, but a group gives the best results. Males call with a soft, owl-like hooting that is louder than you would expect from so small a frog.

The species is suited to observation, not handling. If an animal must be moved, use a small, damp container, or handle with wet, clean hands and do it quickly. Do not keep the species with other frog species.

Breeding

SEXUAL MATURITY AND SEXING

The animals cannot be sexed until they are six to eight months old. Females are larger, longer and wider and look very round, because they almost always produce eggs. Males are smaller, have red nuptial pads on the inside of the forelimbs and call with a soft hooting. The sex ratio is fairly even, even when the tadpoles grow up at room temperature, and this is a great advantage compared with the cooler montane species in the genus.

MATING

Not much is required to trigger breeding: keep the sexes together, and give slightly more food than normal, so that the animals build up fat reserves. Provide many cork tubes standing partly in the water, and change the water every week with cooler water; the pair is often seen in amplexus within a few days. The male grasps the female behind the forelimbs.

The species can breed all year round, but a few months of breeding are usually followed by several months of rest. If the animals continue for more than four to five months, the sexes can be separated for a time, so that the females do not become exhausted.

EGGS AND TADPOLES

The eggs are attached two at a time in a clear, tough jelly on the underside of cork tubes and sheets or on other surfaces 2-3 cm above the water, so that the tadpoles fall directly into the water on hatching. No foam nest is made. The eggs are about 8 mm, and a laying is small, typically 4-15 eggs. Leave the eggs where they sit, and keep them moist. The parents care for neither eggs nor tadpoles.

The tadpoles can stay with the adults for a time, but are best moved to a container of their own: a small plastic box or an aquarium with about 10 cm of the same water as in the terrarium and some leaves of *Terminalia catappa*, which they also gnaw. Keep the water at room temperature, 20-24 °C. Give small food pellets to tadpoles twice a week; they also eat drowned feeder insects. Change half of the water every week. The tadpoles are grey.

METAMORPHOSIS

The eggs hatch after about 7-14 days; the figure applies to the genus and has not been measured for the species. The larval period is not documented for *Theloderma asperum* either, and the figure in the specifications is borrowed from the closely related *Theloderma corticale*. Metamorphosis typically takes about three months, but it can be drawn out to half a year.

When the forelimbs appear, the water must be lowered to at most 5 cm, and there must be an easy route up onto land with cork, roots or floating plants. Once the young have been on land for about a week, they begin to eat.

REARING THE YOUNG

The newly metamorphosed young are small and are moved to a simple terrarium with 2-5 cm of water, floating cork sheets and a couple of pothos cuttings, so that they are easy to keep an eye on. Keep the temperature at 20-24 °C. First food is springtails, fruit flies and the smallest crickets of about 3 mm, fed every day or every other day and dusted with calcium and vitamins. After two to four months they can move to a larger terrarium, and after six to eight months the sex can be determined.

Health and common mistakes

Theloderma asperum is hardy when temperature and humidity are right. The typical problems are:

- Too high a temperature. Above 27 °C can be fatal. Cool immediately.
- Air that is too dry without access to water. This can quickly be fatal.
- Poor water quality in the water section. Change the water regularly.
- A lack of calcium and vitamins, especially in females and juveniles. Dust the food.
- Chytrid fungus and other infections. Quarantine new animals.
- Obesity in overfed animals.

See a vet with expertise in amphibians if a frog loses weight, stops eating, develops sores, discoloured skin or cloudy eyes.

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.