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FROGS

Chantaburi Bug-eyed Frog

Theloderma stellatum

Theloderma stellatum is a small, tree-dwelling mossy frog from the lowland rainforest of Thailand, Cambodia, Laos and Vietnam. It resembles a darker version of *Theloderma asperum*, grows to about 3-4 cm and lays its eggs above water in water-filled tree hollows. Its care is similar to that of its relatives, but almost all figures are borrowed from them, because the species is rare in captivity.

Family: Rhacophoridae

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**
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	**8-10 months**
Eggs per clutch	**4-15**
Hatching	**10-14 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 stellatum is a small frog in the genus *Theloderma*, which hobbyists call mossy frogs. It resembles a darker version of *Theloderma asperum*, with warty skin, dark and light markings and camouflage that makes it disappear among moss, bark and lichen. Some animals show orange colouring. The species name *stellatum* means starry.

The size has not been measured in the sources that were read; the 3-4 cm in the specifications is an estimate borrowed from the closely related *T. asperum*. Lifespan is not documented either; the figure is borrowed from *T. asperum*, and mossy frogs can generally live many years in captivity. The species was described by Edward Harrison Taylor in 1962.

A toxic skin secretion has not been described, but always wash your hands before and after contact with a frog or the enclosure water. The species is for looking at, not for picking up.

Distribution and habitat

Theloderma stellatum occurs in Thailand, Cambodia, Laos and Vietnam. The English name refers to Chanthaburi province in south-eastern Thailand. It lives from sea level up to about 1,500 metres and occurs in several protected areas, including the Cardamom Mountains in Cambodia and Khao Soi Dao in Thailand.

The population is of least concern (LC), but threatened by forest clearance for agriculture and logging. Illegal felling of trees for the production of safrole oil is also a threat, because the frogs use tree hollows. The species is rare in trade.

> **Native range:** Thailand, Cambodia, Laos and Vietnam.

HABITAT

Theloderma stellatum lives in humid lowland forest and montane forest, which is warm and very humid all year round. The frogs are tree-dwelling and stay close to water: the eggs are laid in rainwater that collects in small hollows in trees. The tadpoles feed on decaying plant matter in the tannin-rich water. Where trees are tapped for resin, more hollows form, and the frogs breed in these too.

Mossy frogs stay in the humid hollows and close to water all year. Nocturnal activity and temperature requirements are not documented for the species, and the figures in the care section are borrowed from its relatives.

Read more: Rearing tadpoles

Care

THE ENCLOSURE

Little documented knowledge exists on the care of *Theloderma stellatum*. The care advice is based on the climate in the species' range and on the closely related *Theloderma asperum* and *Theloderma corticale*, which are regularly kept in captivity. The figures in the specifications are borrowed from *T. asperum*, which lives in the same lowland forest.

T. stellatum is small and tree-dwelling and can be kept in a relatively compact enclosure. An enclosure measuring 45 × 45 × 45 cm (length × width × height) is suitable for a small group of four animals. The frog likes to sit by the water's edge, so the height should be used.

Set up the enclosure as a paludarium with a tree hollow and a moist forest floor: cork tubes and cork plates vertically and at an angle over the water, branches, moss and plants such as pothos, peace lily and low ferns. Cork tubes with an internal diameter of at least 7 cm, standing partly in the water, are used both as hiding places and for egg-laying. Keep the substrate moist with a layer of moss and leaf litter, and provide an easy route from water to land so that newly metamorphosed young can climb out. The lid must hold in the humidity but have ventilation so that the air does not stagnate. 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 comes from the lowlands and is probably less sensitive to heat than the cool montane species in the genus, but the temperature should still not exceed 25 °C. Over 27 °C is dangerous, so cool immediately. If the enclosure cannot be kept below 27 °C in summer, choose another species.

Measure with a digital thermometer, and keep the enclosure away from south-facing windows and heat sources. Heat lamps do not belong. On hot days, misting with cold water or ice cubes of reverse-osmosis water in the water section can help. A winter rest is not necessary.

HUMIDITY AND MISTING

Humidity should be 75-95 % and never below 60 %, otherwise the frogs may dry out. The large water surface keeps the humidity up on its own, so the frogs do not need much misting. Two to three times a week is enough to rinse droppings off the furnishings and down into the water.

A misting system is practical, because cold water also cools the enclosure. Make sure the air does not become stagnant. Before the breeding season, mist more and raise the water level, so that it resembles the beginning of the rainy season.

WATER AND WATER QUALITY

The frog spends a lot of time at the water's edge and even sits under water, so the water section is not there for show. Provide a permanent water section 5-10 cm deep with cork plates and cork tubes, so that both adults and young can easily climb out. Use reverse-osmosis water remineralised with an amphibian supplement, and add tannins 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 each week. Water that is too clean can cause eye problems. Rinse your hands free of soap and cream before touching the water, and never use cleaning products in the enclosure. 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 species (Ferguson zone 1) can be used and is optional, but the frogs must always be able to retreat into shade. Live plants need plant lighting, for example a 6,500 K T5 tube for 12 hours a day. The light must not heat the enclosure. A dim red night light or moon lamp makes it possible to watch the frogs when they are active.

Read more: Lighting and UVB

FEEDING

T. stellatum eats insects. Small crickets are the main food, supplemented with waxworms, flies, springtails for the smallest young, small dubia roaches and soldier fly larvae. Feeder insects must be no longer than the distance between the frog's eyes: about 3 mm for newly metamorphosed young and up to 10 mm for adults. Dust the food with a good vitamin and mineral supplement, alternating calcium with D3 and a multivitamin.

Feed just after the lights go out, and put 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.

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

BEHAVIOUR AND HANDLING

Theloderma stellatum is nocturnal and sits hidden by day in tubes, among plants or close to the water. The frog does well in a group as long as there is enough space. The males call at night.

The species is for observing, not for handling. If an animal has to be moved, use a small, moist container, or handle it with wet, clean hands and be quick. 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 and broader with a shorter snout. Males are smaller and have nuptial pads on the first finger, which are red and swollen in the breeding season. The figures for sexual maturity are borrowed from *T. asperum* and the genus.

MATING

Not much is needed to get breeding started: keep the sexes together, and give a little more food than usual so that the animals build up fat reserves. Provide many cork tubes standing partly in the water, and change the water every week with cool water; the pair is often seen in amplexus within a few days. The male grips the female behind the forelegs.

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

EGGS AND TADPOLES

The eggs are laid on the underside of cork tubes and cork plates or on other surfaces 2-3 cm above the water, so that the tadpoles fall straight into the water when they hatch. In the wild they are laid in rainwater in tree hollows. The number per clutch is not documented for the species; the figure in the specifications is borrowed from *T. asperum*. Leave the eggs where they are, and keep them moist. The parents do not care for eggs or tadpoles.

The tadpoles 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 enclosure and some leaves of *Terminalia catappa*, which they also gnaw. Keep the water at 20-24 °C. Give small tadpole food pellets twice a week; they also eat drowned feeder insects. Change half of the water every week.

METAMORPHOSIS

The eggs hatch after about 10-14 days; the figure applies to the genus and has not been measured for the species. The larval period is not documented for *Theloderma stellatum* either, and the figure in the specifications is borrowed from its relatives. Metamorphosis typically takes about three months, but it can drag on for half a year or more.

When the forelegs appear, the water must be lowered to no more than 5 cm, and there must be an easy route onto land with cork, roots or floating plants. When the young have been on land for about a week, they begin to eat.

REARING THE YOUNG

The newly metamorphosed young are moved to a simple enclosure with 2-5 cm of water, floating cork plates and a few cuttings of pothos, so that they are easy to keep an eye on. Keep the temperature at 20-24 °C. The first food is springtails, fruit flies and the smallest crickets of about 3 mm, fed every day or every second day and dusted with calcium and vitamins. After two to four months they can move to a larger enclosure.

Health and common mistakes

Theloderma stellatum is hardy when the temperature is right. The typical problems are:

- Too high a temperature. Over 25 °C is a warning sign, and over 27 °C can be fatal. Cool immediately.
- Air that is too dry, with no access to water.
- Water that is too clean, which can cause eye problems. Use tannins.
- Lack of calcium and vitamins, especially in females and young. Dust the food.
- Chytrid fungus and other infections. Keep new animals in quarantine for six weeks.
- Obesity in overfed animals.

Seek a vet with knowledge of 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.