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FROGS

White-lipped Tree Frog

Nyctimystes infrafrenatus

Nyctimystes infrafrenatus is a large, green tree frog of 11-14 cm and is regarded as the world's largest tree frog. It lives in the lowlands of New Guinea and surrounding islands and in north-eastern Australia, often close to people. It is calm and likes to sit in view, but needs warmth, a large and tall enclosure and a proper water section.

Family: Pelodryadidae Former name: *Litoria infrafrenata* **Mild skin toxins**

KEY FACTS

THE ANIMAL

Adult size	**11-14 cm** snout-vent length
Weight	**30-60 g**
Lifespan	**10-20 years**
Active	**At night**
Lifestyle	**Arboreal**
Habitat	**Rainforest and wetland**
Skin toxins	**Mild** Wash your hands after contact and keep your fingers away from your eyes and mouth
Difficulty	**Intermediate**

CARE

Min. enclosure	**90 × 45 × 90 cm** L × W × H for 2 adults
Temperature, day	**24-28 °C**
Temperature, night	**20-22 °C**
Humidity	**60-95%**
Water	**Water section** depth 10-15 cm
UVB	**Recommended** Ferguson zone 2
Diet	**Insects**
Kept	**Singly, in pairs or in groups**

BREEDING

Reproduction	**Egg-laying**
Development	**Tadpoles in water**
Egg-laying site	**In water**
Sexually mature	**6-8 months**
Eggs per clutch	**100-6,000**
Hatching	**1-2 days**
Larval period	**42-60 days** from hatching to metamorphosis
Larval diet	**Algae/plants and complete diet**
Parental care	**None**

PROTECTION AND PAPERWORK

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

About the species

Nyctimystes infrafrenatus is Australia's largest frog and is regarded as the world's largest tree frog. Adults measure 11-14 cm from snout to vent, on average about 11 cm, and typically weigh 30-60 g. The body is stout with long legs and large adhesive discs. The toes are fully webbed, and the fingers are at least half webbed.

The back is usually a light grass green, but the colour changes with temperature and background and can turn brown; there are also reddish-brown, violet, almost black and metallic blue animals. The most distinctive feature is a white to cream-coloured band along the lower lip that continues under the eardrum to the shoulder. A similar band runs along the rear edge

of the lower leg and can turn salmon-coloured, especially in males in the breeding season. The underside is whitish and granular. Females are larger and have thicker skin than males, and the male has a vocal sac.

The species was described by Albert Günther in 1867 as *Hyla infrafrenata* and appears in older literature and with dealers as *Litoria infrafrenata*. The genus placement is still disputed: *Nyctimystes infrafrenatus* is used here, but the species is also placed in the genus *Sandyrana*.

Skin toxicity: The species is not known to be particularly poisonous, but the skin secretes a substance with antimicrobial peptides (frenatins), as in the close relative *Ranoidea caerulea*. It can irritate mucous membranes, and there is no information on any difference between wild and captive-bred animals. Wash your hands after contact, and do not touch your eyes and mouth afterwards.

The temperament is calm, and the animals often sit out in the open, also during the day. The species is, however, regarded as more delicate and harder to keep and breed than *R. caerulea*, especially when the animals are wild caught.

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

Distribution and habitat

Nyctimystes infrafrenatus lives in north-eastern Australia along the coast of the Cape York Peninsula and in the wet tropics of Queensland around Townsville. It is the most widespread tree frog in the New Guinea region and is found from eastern Indonesia across the whole of New Guinea to the Bismarck and Admiralty Islands. Occurrences in the Solomon Islands and in Timor-Leste have also been reported, but are uncertain and are not shown on the map.

In Australia, animals are occasionally transported south in crates of bananas and other fruit and turn up far from the original range. These are not established populations.

> **Native range:** Australia, Indonesia and Papua New Guinea.

HABITAT

Nyctimystes infrafrenatus is not fussy about its habitats: rainforest, moist and dry forest, heath bogs, tea-tree swamps, mangrove, savanna, plantations, gardens and parks, especially in coastal lowlands. In dry regions it is only found where there are bodies of water to breed in. It often lives in and around houses, sheds and garages. The species is a lowland frog that probably does not go above about 1,200 m.

The frog is most active at night, but is more diurnal than many other tree frogs and likes to rest during the day in places where the sun reaches. In the dry season it hides in tree hollows and under bark and stones. The males call in spring and summer in the southern hemisphere, after rain, from the vegetation around still water. The call resembles the barking of a large dog. Temperature and humidity in the habitats are not documented. The species can live to over 10 years of age in the wild.

Read more: Humidity, misting and ventilation

Care

THE ENCLOSURE

Two adult *N. infrafrenatus* can be kept in an enclosure of 90 × 45 × 90 cm. More animals need more floor area. The species is large and climbs, so provide both height and floor area, and make the enclosure well ventilated and completely escape-proof. A lid with fibreglass fly mesh lets UV light through; never use steel or aluminium mesh, because it tears the skin.

Plant with sturdy plants that tolerate heat, humidity and low light: golden pothos, *Ficus*, *Spathiphyllum*, *Philodendron*, orchids and bromeliads. The frogs are heavy and rough on the planting. Provide sturdy branches, cork and a few shady spots. The substrate can be coconut fibre, bark chips or a mixture of soil and leaf litter over a drainage layer; a bare glass floor also works. Soil easily becomes waterlogged and breeds harmful bacteria, so ensure good drainage, e.g. a hole in the floor under the land section with mesh, gravel and then soil on top. Remove droppings and dead feeder insects regularly.

Read more: Terrarium construction and bioactive substrate

TEMPERATURE

Keep the enclosure at 24-28 °C during the day and 20-22 °C at night. The species must be kept warm: prolonged cold below 15 °C is fatal. If the enclosure is in an unheated room, an aquarium heater in the water section is the easiest solution; if the water is kept at 28-30 °C, the air stays above 20 °C. A waterfall or other water movement increases evaporation and keeps both temperature and humidity stable. If heat loss is large, part of the lid can be covered with glass or plastic, but not under the light fitting, so that the UV light still reaches down.

Winter rest is not necessary. Where the limit for too much heat lies is not documented, so stick to the stated figures, and avoid direct sunlight on the enclosure.

HUMIDITY AND MISTING

Keep the humidity at 60-95 %, and spray the enclosure daily with rain water or dechlorinated tap water. A large water section with a little water movement makes it easy to keep humidity at the high end. At the same time ensure good ventilation, so that the air does not become stagnant, because that causes respiratory problems and mould. The frog must always have access to water, otherwise it risks drying out.

WATER AND WATER QUALITY

N. infrafrenatus needs a proper water section of 10-15 cm; it retains humidity and is necessary if the animals are to breed. It can cover a large part of the floor. The frog does not swim particularly well, so there must be several easy ways out, especially in the corners, where small frogs easily get trapped because they cannot break the surface tension on smooth glass.

Use tap water from which chlorine has been removed, either by letting it stand for a day or two in a bucket or with a chlorine-neutralising aquarium product. Never use hot water from the tap, because it can contain copper, which is toxic to frogs; instead heat cold water in a stainless steel pot. A 90 cm terrarium with 15 cm of water over half the floor and three adult frogs, without plants or filter, requires a water change about once a week. Plants and a filter make the changes less frequent, but the filter must not create so much current that tadpoles and juveniles are pulled along. Never use soap or cleaning products.

Read more: Rearing tadpoles

LIGHTING AND UVB

The species is mainly nocturnal, but rests during the day in places with sunlight, and growth arrest and deformities have been seen in animals kept entirely without UV light. The species can manage with the light the plants require, but against that background UVB is rated as recommended here. A weak UVB source with ample shade (Ferguson zone 2, an estimate) is a good choice. Fluorescent tubes should hang about 40 cm above the floor, because the UV light does not reach further down, and UV tubes should be replaced after 18-24 months, even though they still light up.

Provide 12 hours of light a day, at least 6-8 hours, on a timer. If the animals are to breed, the day length can be varied with the seasons.

Read more: Lighting and UVB

FEEDING

N. infrafrenatus eats almost anything that moves and can be swallowed: crickets, cockroaches, migratory locusts, blowflies, silkworms and earthworms. Waxworms and mealworms are treats. The feeder insects must be no wider than the frog's mouth. Avoid pinkie mice and strips of meat: too much protein strains the kidneys and leads to gout, irreversible kidney damage and death. A varied insect diet is the key.

Juveniles (10-35 mm) eat fruit flies, houseflies, firebrats, small crickets and cockroaches and should have food available at all times. Adults get about 10-20 % of their own size in food spread over 2-3 meals a week. Dust the food with equal parts calcium and multivitamin at every second or third feeding, and mix only a little at a time, because the calcium breaks down the vitamins. Remove drowned insects from the water, or give the food with tweezers. The species easily becomes fat, so keep an eye on weight.

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

BEHAVIOUR AND HANDLING

N. infrafrenatus is calm and curious and often sits visibly in view, also during the day. It does not jump much, but waits for prey to pass by and then leaps the last 10-15 cm. Outside the breeding season it is not social and can be kept alone, in a pair or in a small group when space allows. It eats anything it can fit its mouth around, so smaller frogs and lizards do not belong in the enclosure, and only animals of similar size should be kept together.

The males call loudly and deeply, especially when humidity rises, so the enclosure does not belong in the bedroom. Handle as little as possible: the skin is sensitive to grease, soap and chemicals. Use a transparent tub, or clean, wet hands or powder-free gloves, when the frog has to be moved. If frightened, it can let out a cat-like meow or empty its bladder.

Breeding

SEXUAL MATURITY AND SEXING

The female is larger and thicker than the male, and the male has a vocal sac and calls. Sexually mature males can develop dark nuptial pads on the thumb. Young frogs that are kept warm and given plenty of food reach breeding size and the adult size of 12-14 cm in only 6-8 months. Keep a small group if you want both sexes.

MATING

In the wild the males call in spring and summer after rain. In the enclosure, breeding is triggered with heavier misting and higher humidity, a small rise in temperature and a larger water section for egg laying; a day length that follows the seasons can also help. Beyond that, captive breeding is only sparsely described. The male clasps the female, and the eggs are fertilised outside the body. Water depth does not matter much: the species can breed in as little as 15 cm of water.

EGGS AND TADPOLES

N. infrafrenatus lays its eggs in clumps of clear jelly on the surface of permanent and temporary bodies of water. The female lays from about 100 to several thousand eggs at a time, up to 6,000, and the eggs are about 3 mm. The number is poorly documented. There is no parental care, so remove the adults, or move the eggs to a tub with clean, oxygen-rich water.

The tadpoles are dark brown with a pale stripe on each side of the head, body and tail. They live on algae and can be fed finely crushed fish food, tadpole food and spirulina. Keep the water warm and clean, change it often, and distribute the tadpoles among several tubs if there are many. A small addition of aquarium salt at half dose helps against fungus.

METAMORPHOSIS

The eggs hatch after 1-2 days, and metamorphosis occurs after 6-8 weeks; the whole development from egg to frog takes about eight weeks. When the front legs appear, the tadpole must be able to get out of the water easily: lower the water level, and add sloping stones, cork or floating plants. Newly metamorphosed juveniles easily drown if they only have smooth glass to hold on to, so make a water edge with plenty of ledges.

REARING THE YOUNG

Newly metamorphosed juveniles need food at all times: fruit flies, flies, small moths, small crickets and small cockroaches, dusted with calcium and vitamins. Keep them warm and moist with easy access to both water and land. With warmth and plenty of food they grow to breeding size in 6-8 months. Sort by size, because the species eats anything that can be swallowed. When juveniles are best moved to a larger enclosure is not documented.

Health and common mistakes

Few diseases have been described specifically for *N. infrafrenatus*, but these problems recur in large tree frogs:

- Cold: prolonged exposure below 15 °C is fatal. Keep the enclosure warm, and check the temperature at night.
- Wrong diet: too little calcium and vitamins causes bone disease, and too much protein causes gout and kidney damage. Feed a varied diet, dust the food, and avoid pinkie mice and meat.
- Lack of UV light: growth arrest and deformities have been seen in animals kept without it.
- Skin infections: reddish or bluish discolouration and white, cottony or fungal areas, especially on the lower belly, around the vent and on the inside of the hind legs, are caused by bacteria and fungi and require prompt treatment. Respiratory infections are caused by stagnant air and dirt.
- Tremors or cramp-like movements in the legs when handled are a warning sign.
- Overweight from too much food and drying out from too low humidity.
- Wild-caught animals: many animals in the trade are caught in the wild. Keep them in quarantine.

A healthy frog mostly sits in the upper part of the enclosure, is sturdy without being fat and has a large appetite. A sick frog more often sits on the floor and looks slim with slack skin. Isolate the animal, and seek a vet with amphibian experience. Never release frogs or tadpoles into the wild.

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.