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FROGS

Wallace's Flying Frog

Rhacophorus nigropalmatus

Rhacophorus nigropalmatus is one of the largest flying frogs and lives high up in the rainforest of Borneo, Sumatra and the Malay Peninsula. It is emerald green with black webbing between fingers and toes, and with its spread webbing it can glide up to 15 m between the trees. Females reach up to 10 cm. The species requires a very large, tall and warm terrarium, and little is known about its care and breeding.

Family: Rhacophoridae

KEY FACTS

THE ANIMAL

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

CARE

Min. enclosure	**120 × 80 × 120 cm** L × W × H for 2 adults
Temperature, day	**24-28 °C**
Temperature, night	**21-23 °C**
Humidity	**70-90%**
Water	**Water section** depth 10 cm
UVB	**Recommended** Ferguson zone 1
Diet	**Insects**
Kept	**In pairs or in groups**

BREEDING

Reproduction	**Egg-laying**
Development	**Tadpoles in water**
Egg-laying site	**In a foam nest**
Eggs per clutch	**800**
Larval period	**42-85 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

Rhacophorus nigropalmatus is a slender, long-legged tree frog and the largest tree frog on Borneo. The back is a shiny emerald green with small white spots, and the sides and the innermost part of the fingers and toes are yellow. The webbing between fingers and toes on all four feet is black at the base and pale yellow along the edge. The underside is white to pale yellow. The eyes are large with a pale yellow iris and a horizontal pupil, and all fingers and toes end in large adhesive discs. Along the forearm, fingers, toes and heel there are skin folds, which together with the webbing make the frog an effective glider.

Females are larger than males: females reach 9-10 cm, males 8-9 cm. The weight is not documented.

The newly metamorphosed young look nothing like the adults. They are bright orange-red and develop small white spots about a month after metamorphosis. The frog stays red for about a year before changing to green, and at 9-11 months of age the young are 4-5 cm long. With the red colour and the white spots, the young resemble droppings from birds or bats, and this protects them from predators. Adults, by contrast, are well camouflaged in the foliage.

The species was described in 1895 by George Albert Boulenger and is named after Alfred Russel Wallace, who collected the first known specimen. Animals from Laos, Vietnam and southern China that resemble the species are either *Rhacophorus nigropalmatus* or a closely related, as yet undescribed species.

The species has no known toxic skin secretion. Even so, wash your hands before and after working in the terrarium, and do not touch your eyes or mouth afterwards. In captivity it probably lives 5-10 years.

Read more: Rearing tadpoles

Distribution and habitat

Rhacophorus nigropalmatus is found on the Malay Peninsula, in Thailand and Myanmar, on Sumatra and on Borneo (Malaysia, Indonesia and Brunei). On Borneo it occurs across the whole island. Frogs from Laos, Vietnam and southern China resemble the species, but possibly belong to another species, and those countries are not shown on the map.

The species lives from the lowlands up to about 2,000 m above sea level.

> **Native range:** Thailand, Myanmar (Burma), Malaysia, Indonesia and Brunei.

HABITAT

Rhacophorus nigropalmatus lives high up in the tree canopy in primary and secondary rainforest and is sometimes found in plantations. The frog stays mostly in the middle part of the canopy and sits close to the trunks and the thin branches, which it clings to securely despite its size. From the canopy it glides along long, sloping paths to a lower tree or all the way down to the forest floor, up to 15 m or more.

The frogs come down only to breed. The female builds a foam nest on vegetation above temporary forest pools, puddles, roadside ditches and wild boar wallows, and the tadpoles fall into the water when the nest breaks down. The male's call is a long, low trill that resembles soft knocks on wood. The tadpoles reach about 5-6 cm in length, live in murky, muddy water and hide in the mud by day. At night they forage along the bottom.

The species is nocturnal. Its diet in the wild is insects and other small arthropods; large animals may also eat small vertebrates. It is itself taken by snakes that climb in the trees.

Care

THE ENCLOSURE

Little is known about keeping *Rhacophorus nigropalmatus*, and the figures here are based on the species itself and on the closely related *Rhacophorus reinwardtii*, which is smaller. The species is large, nocturnal and a glider, so the terrarium must be tall, deep and spacious. A pair needs at least 120 × 80 × 120 cm, and a group needs more. Wild-caught animals easily injure themselves when they leap around at night, so a captive-bred frog is the only sensible choice.

The furnishings must provide many perches at different heights: vertical and horizontal branches, cork bark and plants with large, sturdy leaves such as *Philodendron* and *Epipremnum*. Keep the middle part of the terrarium fairly open, so that the frog can jump and glide without hitting the glass, and plant densely in front of the front pane, so that there are no large, open glass surfaces. A cork back wall is a good idea. The substrate must be loose and moisture-retaining, for example a bioactive substrate with sphagnum and dead leaves. A mesh across the whole lid ensures that the air does not stand still.

Read more: Terrarium construction and bioactive substrate Read more: Buying animals: captive-bred, wild-caught and transport

TEMPERATURE

Keep the terrarium at 24-28 °C by day and 21-23 °C at night. This corresponds to the lowland rainforest where the species lives, and the temperature must not exceed 30 °C. Do not use heat lamps, but heat the room, and check the temperature at the top of the terrarium with a digital thermometer. A winter rest is not documented and is not necessary.

HUMIDITY AND MISTING

Humidity should be 70-90 %. Mist the terrarium thoroughly every day with dechlorinated tap water, rainwater or reverse-osmosis water, and let it dry out a little during the day. A mesh across the whole lid and good air circulation prevent mould and overly stagnant air.

Wrinkled skin or a sluggish frog are signs of desiccation: increase the humidity and lower the temperature immediately.

Read more: Humidity, misting and ventilation

WATER AND WATER QUALITY

The species must have a permanent water area that it can sit in and lay eggs above. The water must be 10 cm deep, and the frog must be able to get out easily via branches, cork and stones. Place branches and large leaves above the water, where the female can build her foam nest. Change the water as soon as it is dirty, and preferably every day or every other day. Use dechlorinated tap water, rainwater or reverse-osmosis water, and never use soap or cleaning products near the water, because amphibians absorb substances through the skin. The water must be at the same temperature as the air.

LIGHTING AND UVB

The frog lives high up in the tree canopy, and a weak UVB source of the type used for tropical forest animals is recommended. It has not been studied whether the species needs it, so always provide shaded places where the frog can retreat.

Use LED lighting that is strong enough for the plants, and avoid lamps that give off heat. Keep a fixed daily rhythm with 12 hours of light and 12 hours of darkness; the frog is nocturnal and becomes stressed by disturbance in the terrarium during the day.

Read more: Lighting and UVB

FEEDING

Rhacophorus nigropalmatus eats live insects. Adults take large crickets, grasshoppers, large cockroaches and occasionally a wax moth larva as a treat; juveniles take smaller crickets, about a third of the width of the head. The feeding frequency is not documented. Feed adults every second or third day, juveniles more often, and remove feeder insects that are not eaten. Dust the food with calcium, and give a vitamin supplement containing D3 a few times a month, as is usual for tree frogs. Do not feed the frog vertebrates.

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

BEHAVIOUR AND HANDLING

The species is shy and nocturnal and spends the day hidden among the leaves, often sitting tightly curled up on a branch or on the glass. At night it becomes active, climbing and gliding. It should not be handled: the skin is thin and sensitive, and the frog jumps and glides wildly when startled.

It can be kept in pairs or in a small group in a spacious terrarium with many perches. If males are in the majority, they may call and compete during the breeding season, so do not keep more males together than the terrarium is large enough for. During cleaning the frog is moved with a damp, soft plastic tub.

Breeding

SEXUAL MATURITY AND SEXING

Females are larger and sturdier than males and reach 9-10 cm, while males reach 8-9 cm. Males call at night with a low, trilling sound. When the animals become sexually mature is not documented, but the young are 4-5 cm long at 9-11 months of age and change to green only during the first year of life. Young animals are hard to sex, so sort them when the sexes can be seen.

MATING

In the wild the frogs come down from the tree canopy to temporary forest pools, where the males call. The female makes a foam nest, and the male fertilises the eggs while the foam is whipped. In the terrarium, breeding requires a clear seasonal cycle with a dry and a rainy period, heavy daily misting or a rain system, and plenty of food, as in other tropical tree frogs. Breeding in the terrarium is only sparsely described for the species.

EGGS AND TADPOLES

The female makes a foam nest on a branch or leaf above the water, and a nest can hold up to about 800 eggs. The parents leave the nest and care for neither eggs nor tadpoles. When the tadpoles hatch, they fall into the water beneath the nest. Provide a water area at least 10 cm deep directly beneath the branches and leaves where the frogs can lay, or cut the leaf off and hang it above an aquarium.

The care of the tadpoles is based on related flying frogs. The tadpoles are large, up to about 5-6 cm, and hide in the bottom material by day, so give them a soft bottom of mud or sand and a large volume of water. Use 20-24 °C and a daily water change of 10-20 %. The tadpoles eat spirulina tablets and other sinking prepared food as well as algae and aquatic plants.

METAMORPHOSIS

The tadpoles hatch from the foam nest after a few days. The larval period is not documented for the species; 6-12 weeks, as in *Rhacophorus reinwardtii* and *Zhangixalus arboreus*, is a guide. When the forelimbs appear, the tadpoles stop eating and need easy access to land: lower the water level, put cork or branches in the water, and keep a lid or mesh on the aquarium, so that the newly metamorphosed froglets cannot escape. Provide a moist transition to land with plants and wet hiding places.

REARING THE YOUNG

The newly metamorphosed froglets are orange-red and go into a small, humid terrarium with kitchen paper or sphagnum as the substrate, plants and a shallow water bowl. Humidity must be high, 80 % or more. Give small, dusted crickets or fruit flies, a few and often, once the tail has been absorbed, and sort by size, so that the smallest are not outcompeted. The white spots appear about a month after metamorphosis. Keep the young in a smaller terrarium until they are about 4-5 cm and large enough to cope among the adults. They change to green during the first year of life.

Health and common mistakes

Common problems in tree frogs in terrariums are:

- Desiccation and too high a temperature. The signs are lethargy, wrinkled skin and outstretched legs. Keep an eye on the thermometer and hygrometer, and make sure to mist every day.
- Injuries from jumping against the glass. Wild-caught animals in particular hurt themselves when they glide around at night.
- Infectious diseases and parasites, especially in wild-caught animals. Buy captive-bred animals, quarantine new animals, and use separate equipment.
- A one-sided diet or a lack of calcium and D3, which can cause weakened bones. Vary the food.

See a vet with expertise in amphibians if the frog stops eating, has sores, swellings or reddish areas on the skin, or sits listlessly on the floor.

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.