



TIMOTHY HALLIDAY

# THE BOOK OF FROGS

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A LIFE-SIZE  
GUIDE TO  
SIX HUNDRED  
SPECIES FROM  
AROUND  
THE WORLD

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# THE BOOK OF FROGS

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FROM AROUND THE WORLD

TIMOTHY HALLIDAY

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With over 7,000 known species, frogs display a stunning array of forms and behaviors. A single gram of the toxin produced by the skin of the golden poison dart frog can kill 100,000 people. Male Darwin frogs carry their tadpoles in their vocal sacs for sixty days before coughing them out into the world. The wood frogs of North America freeze every winter, reanimating in the spring from the glucose and urea that prevent cell collapse.

*The Book of Frogs* commemorates the diversity and magnificence of all of these creatures, and many more. Six hundred of nature's most fascinating frog species are displayed, with each entry including a distribution map, sketches of the frogs, species identification, natural history, and conservation status. Life-size color photos show the frogs at their actual size—with the exception of the colossal seven-pound Goliath frog. Accessibly written by expert Tim Halliday and containing the most up-to-date information, *The Book of Frogs* will captivate both veteran researchers and amateur herpetologists.

As frogs increasingly make headlines for their troubling worldwide decline, the importance of these fascinating creatures to their eco-systems remains underappreciated. *The Book of Frogs* brings readers face to face with six hundred astonishingly unique and irreplaceable species that display a diverse array of adaptations to habitats that are under threat of destruction throughout the world.

**Timothy Halliday** was formerly professor of biology at The Open University.

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ALYTES OBSTETRICANS



FAMILY	Alytidae
OTHER NAMES	Crapaud accroucheur, Sapo part
DISTRIBUTION	Western Europe. Introduced to U.K.
ADULT HABITAT	Woodland, gardens, dry-stone walls, quarries, rock slides, up to 6,560 ft (2,000 m). Thrives in agricultural and urban habitats
LARVAL HABITAT	Ponds, slow-moving streams and rivers
CONSERVATION STATUS	Least Concern: Becoming less common across most of its range, due to habitat loss, introduced fish, and the disease chytridiomycosis, which has caused mass mortality, eg in Spain.

ADULT FEMALE LENGTH  
1½–2½ in (30–55 mm)  
Males slightly smaller than females



ALYTES OBSTETRICANS  
**COMMON MIDWIFE TOAD**  
(LAURENTI)

This small, warty frog is famous for the fact that the male carries out prolonged parental care of the eggs. In spring males call from a burrow, producing a high-pitched “poo poo poo.” During an elaborate mating, the female produces her eggs in a string; he fertilizes them and then wraps them around his hind legs. He carries them for three to six weeks, seeking out damp places, and occasionally entering water to moisten them. A female can produce up to four egg clutches each year, and a male can carry up to three clutches, usually from different females, simultaneously. During the weeks the male is carrying eggs his movements are restricted; unable to pursue food, he loses weight.

SIMILAR SPECIES

There are four other species of Midwife Toad, all slightly smaller than *Alytes obstetricans*. *A. cisternasii* occurs in southwest Spain and southern Portugal, *A. dickhilleni* in southeast Spain, and *A. maurus*, a Near Threatened species, occurs in Morocco. The Mallorcan Midwife Toad (*Alytes muletensis*) is confined to a few high altitude sites in Mallorca and is Vulnerable.

**The Midwife Toad** has numerous warts on its back which produce secretions that make it unpalatable to potential predators. These secretions also protect the eggs from fungal infection; if a male loses any of his eggs they quickly become infected and die. This toad is becoming less common across most of its range, due to habitat loss, introduced fish, and the disease chytridiomycosis, which has caused mass mortality, for example in Spain.



Actual size

ASCAPHUS TRUEI



FAMILY	Ascaphidae
OTHER NAMES	Coastal Tailed Frog
DISTRIBUTION	North-western U.S. and Canada
ADULT HABITAT	Humid forest up to 6,560 ft (2,000 m)
LARVAL HABITAT	Mountain streams
CONSERVATION STATUS	Least Concern: Sensitive to logging and road construction

ADULT LENGTH  
1–2 in (25–50mm)  
Female slightly larger than male



ASCAPHUS TRUEI  
**PACIFIC TAILED FROG**  
(STEJNEGER)

This very unusual frog has internal fertilization, the eggs starting their development inside the female’s body. During mating, which takes place in water, the male uses a tail-like extension of his cloaca to insert sperm into her. The female then lays 28–96 eggs in strings under rocks in fast-flowing mountain streams. The tadpoles are adapted to life in running water, with sucker-like mouths by which they can cling to rocks. Though essentially terrestrial, adults have webbed hind feet, enabling them to swim strongly when they do enter water. Unlike most frogs, male Pacific Tailed Frogs do not call.

SIMILAR SPECIES

The Rocky Mountain Tailed Frog (*Ascaphus montanus*) was recently separated from *A. truei* on the basis of genetic differences. It is found in several inland mountain ranges, particularly in Montana, and also Washington, Idaho, and Oregon. It is reported to avoid warm water and is thought to breed only in alternate years.

**The Pacific Tailed Frog** gets its name from the male’s “tail,” which the female, shown here, lacks. Tadpoles typically take two years to reach metamorphosis and may take as long as seven. After metamorphosis, adults do not mature for four years and it is thought that they typically live to be around 20 years old. The species has a remarkably slow life history, reflecting its very cold habitat, and is sensitive to logging and road construction.



Actual size

RHINELLA MARINA



FAMILY	Bufoidea
OTHER NAMES	Marine Toad, Giant Neotropical Toad, Sapó grande, formerly <i>Bufo marinus</i> , <i>Craunus marinus</i>
DISTRIBUTION	From the southern tip of Texas to southern Brazil. Introduced to Australia, some Caribbean and Pacific islands, Hawaii.
ADULT HABITAT	Near rivers and wetlands, including brackish water and mangrove swamps. Also found in towns and gardens.
LARVAL HABITAT	Small and large bodies of still water
CONSERVATION STATUS	Least Concern

ADULT LENGTH  
Male 3½–6 in  
(85–150 mm)  
Female up to 9 in  
(225 mm)



RHINELLA MARINA  
**CANE TOAD**  
(LINNAEUS)

The world's largest toad, this formidable species has a voracious appetite. Called the Marine Toad in its native habitat, it is unusual in tolerating brackish water around estuaries and in mangrove swamps. It is attracted to human settlements and is often seen waiting under streetlights for insects to fall. Larger females can lay more than 20,000 eggs in a single clutch. Males attract females with a slow, low-pitched trill, a sound like a distant tractor. Cane Toads have few enemies; as eggs, tadpoles, and adults they are distasteful or toxic to potential predators. This has had a negative impact in Australia, where native reptiles and mammals, as well as domestic cats and dogs, die when they eat the toads.

SIMILAR SPECIES

There are 71 species in the genus *Rhinella*, often referred to as “beaked toads.” All are found in neotropical Central and South America. *Rhinella margaritifera* is common over a wide range, from Panama to Brazil, but some *Rhinella* species are threatened by deforestation.



Actual size

The **Cane Toad** has a warty skin that secretes powerful toxins. In Australia, it gets its name because it was introduced, into Queensland in 1935, to control insect pests on sugar cane farms. This was never likely to be effective, as Cane Toads feed at night and the pests are active by day. They flourished in Australia, feasting on native fauna, and building up much denser populations than in their native habitat. They spread rapidly, increasing their range by around 18 miles (30 km) each year, and they now occur throughout western and northern Australia.

AMIEOTOPHYRUS PANTHERINUS

FAMILY	Bufoidea
OTHER NAMES	Westelike Luiperdskurwepadda, formerly <i>Bufo pantherinus</i>
DISTRIBUTION	Southwestern tip of Africa
ADULT HABITAT	In and close to wetlands, vleis, dams, and ponds
LARVAL HABITAT	Ephemeral ponds
CONSERVATION STATUS	Endangered



ADULT LENGTH  
Male average  
3½ in (90 mm),  
female average 4½ in  
(115 mm), up to 5½ in  
(140 mm)



AMIEOTOPHYRUS PANTHERINUS  
**WESTERN LEOPARD TOAD**  
(SMITH)

Described as an “explosive breeder,” the Western Leopard Toad mates and lays eggs over a period of only four or five days in spring. In the evening and during the night, males call to attract females from vegetation around a pond or from open water. Their call is a prolonged, slow snoring sound. Females approach males and initiate amplexus, during which they lay up to 25,000 eggs. Unlike other toads, males do not attempt to displace rival males from the backs of females, despite males commonly outnumbering females during the breeding period. This species is also unusual in that it eats snails.

SIMILAR SPECIES

*Amietophrynus pantherinus* is one of several toad species found in Southern Africa. It is similar in appearance to the Eastern Leopard Toad (*A. pardalis*), but their ranges do not overlap. Guttural toads (*A. gutturalis*), whose natural range is far to the north, have been introduced to the Cape. They threaten *A. pantherinus* by competing for breeding habitat and hybrid matings between the two species may occur.

The **Western Leopard Toad** earned its name from the striking symmetrical spots on its back. It has a very restricted range and its habitat is being destroyed and fragmented by urban development. Many toads die on roads as they migrate toward their breeding ponds. Alien vegetation threatens breeding sites and introduced fish eat its tadpoles. It is the focus of a vigorous social conservation program.



Actual size

CERATOPHRYA CORNUTA



FAMILY	Ceratophryidae
OTHER NAMES	Surinam Horned Frog, formerly <i>Rana cornuta</i>
DISTRIBUTION	Amazon Basin
ADULT HABITAT	Leaf litter in tropical forest
LARVAL HABITAT	Pools, ponds
CONSERVATION STATUS	Least Concern: Collecting for the pet trade may affect some populations

ADULT LENGTH  
Male up to 3 in  
(72 mm), female up to  
4 1/4 in (120 mm)



CERATOPHRYA CORNUTA  
**AMAZONIAN HORNED FROG**  
(LINNAEUS)

Horned Frogs inhabit leaf litter throughout the Amazon Basin. They are "sit-and-wait" predators, remaining motionless until their prey comes close when, with mouth wide open, they lunge forward. Their heads and mouths are enormous, enabling them to eat not only ants and beetles but also larger creatures, including other frogs, lizards, and mice. They are active at night, burrowing backward into the soil, with only their head above ground. Following rain, males call to attract females, making a loud "baaa" sound. The female lays her eggs, up to 1,000 at a time, in strings wrapped around water plants.

SIMILAR SPECIES

There are eight species in the genus *Ceratophrys*, most with smaller ranges than *C. cornuta*. They too are popular in the international pet trade where, because of their shape, they are often known as "pac-man frogs." *Ceratophrys cranwelli* is persecuted in Argentina, the southern part of its range, because of an erroneous belief that it is venomous. Its eggs are sold internationally for scientific research.

The Amazonian Horned Frog has highly variable color patterns that provide very effective camouflage. It is unusual in having a tadpole that feeds, not on plant food, but on other tadpoles, of its own and of other frog species. Like their parents, the tadpoles are voracious predators and have sharp teeth.

Actual size



ENGSTOMOPS PUSTULOSUS



FAMILY	Leptodactylidae
OTHER NAMES	Sapito de Pustulos, formerly <i>Phrylosaurus pustulosus</i>
DISTRIBUTION	Central and northern South America, Trinidad and Tobago
ADULT HABITAT	Lowland forest, near natural and manmade ponds
LARVAL HABITAT	Temporary pools, puddles, potholes
CONSERVATION STATUS	Least Concern

ENGSTOMOPS PUSTULOSUS  
**TÚNGARA FROG**  
(COPE)

Drab in appearance, the Túngara Frog has an exciting, hazardous sex life. After heavy rain, males enter any kind of pool, including flooded wheel-ruts, and start to call loudly. Their call consists of a "whine" followed by one to six "chucks." The number of "chucks" depends on the level of competition for females; females prefer calls with several "chucks" and so a male has to respond to the calls of neighbors by performing more "chucks." However, this strategy is risky; their calls also attract the predatory Fringe-lipped Bat (*Trichops cirrhosus*) which is more likely to eat males producing calls with more "chucks."

SIMILAR SPECIES

There are nine species in this genus, distributed across Central and South America. All lay their eggs in floating foam nests, consisting of a secretion produced by the female and whipped up by both animals beating their hind legs. The foam keeps the eggs and developing tadpoles moist and cool and also protects them from pathogens and predators.

ADULT LENGTH  
Male average  
1 1/4 in (30 mm), female  
slightly larger



Actual size

The Túngara Frog is a small frog with warty, toad-like skin. It is found close to water from where it calls when breeding. Breeding pools are often ephemeral, so tadpole development can be a race against time. A foam nest can last for two weeks, but usually degrades after four days, when the tadpoles wriggle out of it.



OOPHAGA PUMILIO



FAMILY	Dendrobatiidae
OTHER NAMES	Formerly <i>Dendrobates pumilio</i>
DISTRIBUTION	Costa Rica, Nicaragua, Panama
ADULT HABITAT	Rainforests of the Caribbean coast, up to 3,150 ft (960 m) altitude
LARVAL HABITAT	Tiny water pools in the axils of plants
CONSERVATION STATUS	Least Concern: Intensively collected for the pet trade

ADULT LENGTH  
Both sexes 3/4–1 in  
(17–24 mm)



OOPHAGA PUMILIO

STRAWBERRY POISON-DART FROG

(SCHMIDT)

Both sexes of this species play a role in the parental care of their young. Males call from the forest floor to defend a small territory from intrusion by other males and to attract females. A clutch of 3–17 eggs is laid in a hollow in the soil within a male's territory and he defends them, urinating on them to keep them moist, until they hatch. The female then carries the tadpoles, one or two at a time, on her back to tiny pools of water in the axils of bromeliads and other plants. She then visits them periodically, feeding them with unfertilized eggs.

SIMILAR SPECIES

There are nine species in the genus *Oophaga*, meaning "egg-eating" in reference to the fact that their tadpoles feed exclusively on eggs provided by their mother. Should their mother die or forget where she has left them, her tadpoles will starve to death. All nine species are brightly colored and are found in Central and South America.



Actual size



The Strawberry Poison-Dart Frog is highly variable in color; no fewer than 30 distinct color morphs have been described. That shown here is aptly known as "blue jeans" and is one of the more common forms. Other morphs are all-red, all-blue, and green in color. This species acquires its skin toxin by eating ants; captive animals not fed on ants are not toxic.

MANTELLA MADAGASCARIENSIS



FAMILY	Mantellidae
OTHER NAMES	Malagasy Painted Mantella
DISTRIBUTION	Eastern Madagascar
ADULT HABITAT	Near streams in primary rainforest
LARVAL HABITAT	Streams
CONSERVATION STATUS	Vulnerable: Threatened by habitat destruction and over-collection for the pet trade

ADULT LENGTH  
Male up to 3/4 in  
(22 mm),  
female up to 1 in  
(25 mm)



MANTELLA MADAGASCARIENSIS

MADAGASCAN MANTELLA

(GRANDIDIER)

This tiny, brightly colored frog is active by day, hopping about on the ground in the few patches of natural Madagascan forest that have survived extensive deforestation. It is very variable in color, some individuals being green or yellow and black. It deposits its eggs in streams, where its tadpoles develop. Like the poison-dart frogs of South America, mantellas represent a remarkable example of convergent evolution: both are active by day, have toxic skin secretions, and are brightly colored. Those vivid colors warn potential predators that they are poisonous.

SIMILAR SPECIES

The Madagascan Mantella is similar in color pattern to and can be confused with *Mantella baroni*, a relatively common species, and *M. pulchra* which is classified as Vulnerable. In all, there are 16 species of mantella, most of which are threatened to some degree.



Actual size



The Madagascan Mantella is very popular in the international pet trade because of its vivid coloration and because it is active by day. Over-collection poses an additional threat to its long-term future, already made vulnerable by the fact that its restricted natural range has been reduced and fragmented by deforestation.