

The Amphibians of Kenya

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Introduction

There are two orders of amphibians in Kenya; the frogs and the caecilians. Few people are aware of caecilians, as they are wormlike, burrowing amphibians that live in damp soil. However, we know a lot more about frogs. We know the sounds they make; we have seen them at night on wet roads or around our outside taps, or by day near the shores of lakes and rivers. And yet little is known of their lifestyle. The humble chura is a secretive, and yet spectacular creature of the dark and of water, often mysterious, active only in the rainy season. We hear them more often than we see them; the boom of frogs and toads in the night has often disturbed our sleep. However, frogs are good for humanity. They eat mostly insects; in Kenya's rice and maize fields it is the frogs that keep the insect numbers down and thus provide more food for us. Frogs are our friends.

Frogs are amphibians; that name means 'two lives', as they live on land and in water. The first amphibians crawled from the lakes and rivers onto land about 370 million years ago. Some ancient species were huge, over 8 m long. Those giant amphibians are now extinct; we are left with three orders; the frogs and toads (Anura), the salamanders and newts, (Caudata) and the poorly-known, worm-like caecilians. (Gymnophiona). There are no salamanders or newts in sub-Saharan Africa, but Kenya has over 100 species of frog, and at least seven species of caecilian.

There are legends and myths about frogs. In many African stories the toad plays the part of reliable but slow character.

In the early 19th Century, the Kikuyu seer Mugo wa Kibiru prophesied that 'strangers would come, with skin the colour of the banana frog'; he was talking of the Mountain Reed frog, *Hyperolius montanus*, whose skin is pinkish white. The man was right; seemingly predicting the advent of the colonial era in East Africa. People sometimes fear frogs and toads, believing them to be dangerous. They are not. A few of Kenya's frogs, for example the Red-banded Rubber Frog, *Phrynomantis bifasciatus*, and some toads, have toxic skin secretions but these are only dangerous if the skin toxin accidentally enters a cut.

Kenya's frogs range widely in size. Females are usually larger than the males, as they have to carry the eggs. Our largest frog is the huge African Bullfrog, *Pyxicephalus edulis*, found in Tsavo and Ukambani; this frog can be 14 cm long from snout to vent, and weigh over a kilogram. Our smallest frog, the Unguja Puddle Frog, *Phrynobatrachus ungujae*, is only 1.6 cm long as an adult and weighs less than 2g. Other startling frogs found in Kenya include Peter's Foam-nest Tree Frog, which is waterproof, can change colour and lays its eggs in a mass of foam, the widespread Senegal Kassina, found from Senegal to South Africa, the Northern Clawed Frog, which only leaves the water to migrate in huge numbers, the huge Groove-crowned Bullfrog, which can bounce off the water surface as it jumps, the exquisite endemic Shimba Hills Reed Frog, and the Mt Elgon Torrent frog, not seen since 1962, never photographed and possibly extinct.

Kenya's caecilians look very much like earthworms, and are usually less than 35 cm long. Eight species are known; one of which is undescribed. They live largely in soil and leaf litter in forests along the coast, although one was recently described from Ngaia Forest near the Nyambene Hills in central Kenya.

Many of Kenya's amphibians also occur in other parts of Africa, but about 20 are endemic, found in no other country. Kenya's amphibian fauna is quite varied; some species are associated with the coastal forests of southeast Africa, others with the arid areas of northern and northeastern Africa, and still others with the savannas of southeast and central Africa and the great forests of central Africa. The study of such historical and current distribution of organisms is called biogeography.

Amphibians need water; their skins are not waterproof, with one exception (Foam-nest frogs, *Chiromantis*). Water is lost by evaporation through the skin; if it is not replaced the frog will die by desiccation. Invariably, frogs also need moisture in some form to breed, for eggs to develop, and for their larvae (tadpoles) to exist in the aquatic stage, prior to metamorphosis. Within these constraints, Africa's frogs have adapted to exist in difficult situations. Although a few live on the shores of lakes and rivers, most live in areas without permanent water and have evolved astonishing lifestyles to avoid dehydration and breed. In the dry season, many retreat underground where the soil remains moist, and some even form sealed cocoons. When the rain falls and creates temporary pools, frogs emerge; they may appear in such numbers that people are convinced they have dropped from the sky. A frenzy of activity begins at

darkness (frogs are rarely active by day). The males usually call at the edge of the pools, (every species has a different call) and the females are attracted; the female frog finds her male by the specific sound he's making, if the call isn't right there's no attraction. They mate, fertilisation is nearly always external, and the eggs are usually laid in or near the water. They hatch out into tadpoles. This is a larval form quite unlike the adult frog; tadpoles have gills like a fish. (a few species do not have tadpoles, the eggs developing directly into froglets). The tadpole eats algae and detritus, grows rapidly, and loses its tail and gills; it turns into a little frog. The small frog eats insects and grows very rapidly in the remaining water. When the pool dries up, the frogs either burrow deep in the mud, to where it will remain damp, or find some other moist retreat, such as a hole or deep in a big log. There they remain, waiting for the arrival of another rainy season.

Frogs are ectotherms, or 'cold-blooded', meaning the heat for life processes must come from the environment. Thus, in Kenya, the greatest variety of frogs occurs where it is regularly warm and wet such as along the coast, where over 40 species occur. But even in cold places there are frogs; so long as there is water. Nearly 20 species can be found on the cool Kinangop plateau, at altitudes over 2000m, and a similar number around Nairobi at 1600m elevation. Conversely at Wajir, at low altitude but in Kenya's arid sub-desert north, only six species of frog are known.

The presence or absence of frogs can be an excellent indicator of environmental health. Because of their permeable (leaky) skins, frogs are highly sensitive to environmental conditions and pollution;

they are rapidly affected by toxins which enter through their skin. Healthy water bodies and wetlands will have healthy populations of frogs. If frogs are dying off, this may be an early warning of pollution, which potentially might affect humans as well. In many parts of the world, amphibian populations are suffering a worrying decline, likely due to factors such as environmental degradation, increased ultraviolet radiation and climate change. Moreover, frogs are becoming less resistant to pre-existing factors such as chytrid fungus. Several species have become extinct, even in environmentally conscious countries; for example the Costa Rican Golden Toad and the Australian Gastric Brooding Frog. Frogs not only serve as environmental monitors, the skin of some species has been found to contain complex substances like peptides, surprisingly useful against various skin conditions in humans. It is predicted that many additional substances will be found in amphibian skin. So everyone can do their bit to help our frogs. The use of toxic chemicals needs to be strictly controlled. Water sources should be kept clean. The environment needs protection.

Finally, of course, amphibians play a fundamental role in all the ecosystems they inhabit; both as consumers of insects and other arthropods, and themselves as food sources for secondary consumers such as mammals, birds, reptiles and even other amphibians.

In Kenya, some of the important conservation areas for frogs are the Arabuko-Sokoke Forest, the Shimba Hills National Park, the Tsavo ecosystem, the Maasai Mara National Reserve and conservancies, Kakamega Forest (where frogs of the great central African forest

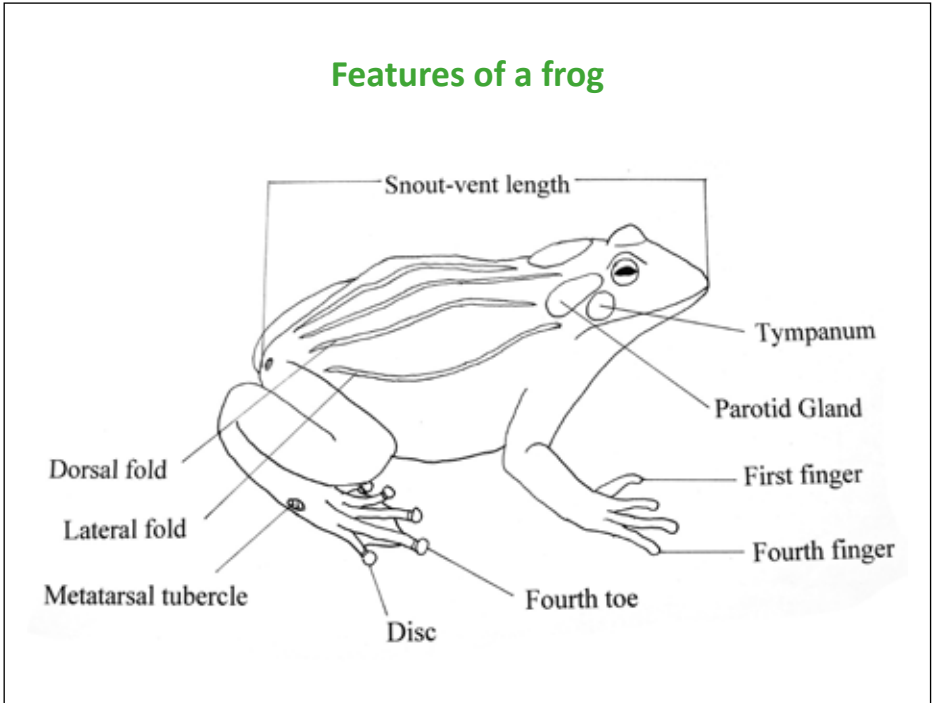
occur) and the mountain national parks such as Mt Elgon, Mt Kenya and the Aberdares. Moreover, there are some important areas with unique amphibians species that are not yet protected nor well understood; for example the Taita Hills, the Tana River Delta, the Mau Forest and the Cherangan'y Hills. At the National Museum in Nairobi, professional herpetologists are actively working on documenting and protecting our frogs. This can be a difficult task, as many species are not well described and thus difficult to identify, in some cases mating calls and even DNA analysis may be required. Moreover it is highly likely that there are additional amphibian species in Kenya awaiting discovery and description. Recent advances in molecular biology have revealed the fact that the Kenya frog fauna is more diverse than previously thought. There is much more field work and laboratory analysis to be undertaken before we have a full understanding of the East African herpetofauna. More information is always needed. The museum herpetologists always welcome photographs and specimens of Kenya's frogs.

And frogs need to be seen to be appreciated. So get out there and find them, and enjoy our wild places. Frogs can be found around taps at night, hiding in plants, under ground cover, and by our rivers and lakes (but sometimes an expert guide is necessary, care must be taken in wild places at night). Our frogs should be enjoyed and respected; they were here millions of years before humanity. A day spent in the wild looking for frogs is better than a day spent on a cell phone or in front of a computer.

How to Use this Book, and Identifying Amphibians

We have tried to keep this book simple, non-technical, and portable, it is intended for field identification. Use it in the field. If you see a frog, or caecilian, try to match it to a photo in this book. If it looks similar, check the map. Is it in the right area? Is it the right size, and in the right sort of place. Take a photo of the frog if you can, and send it to the National Museum, experts there can confirm. Then check a more detailed book or website for extra information. Details of museum contacts, and useful books and websites are on the back cover.

The important features of a frog are shown in the diagram below (a diagnostic diagram for a caecilian is at the start of the caecilian section). Helpful pointers for frog identification are: the locality (place where you found it), the pattern (spots, stripes, bars, if you can look at the underside), and the colour (but remember, frogs of the same species often vary a lot in colour). The size is important, is it as big as a 20 shilling piece (2.5 cm), or as wide as a Tusker bottle (6-7 cm), or even larger. The general shape is important; toads are not the same shape as tree frogs. Look at the pictures. Mating calls can be diagnostic; if recorded on a cell phone, calls can be compared to recordings at museum herpetology departments, or on the internet.



Amphibian Taxonomy

Taxonomy is the scientific classification of organisms, and the relationship between them. The most useful unit is the species; which can be defined as a group of organisms that interbreed and produce fertile offspring. If you can define a species you can say what you are working on. All known species have a scientific name; for example the Guttural Toad bears the scientific name *Sclerophrys gutturalis*. This scientific name allows scientists and herpetologists of different nationalities and languages to discuss different kinds of organisms without confusion.

African amphibian taxonomy is very complicated. It has been said that in Kenya, no frog is hard to identify to the level of the genus, and no frog is easy to identify to the level of species. And this is true to some extent. We identify frogs by their appearance, size, colour, shape and call, and increasingly by matching strands of DNA. But even so, it is hard to tell some frogs apart; even experts often struggle to identify a frog to species level, especially difficult genera like the little puddle frogs, *Phrynobatrachus*.

Senegal Kassina, spotted phase.



Systematic Account of Kenya's Amphibians

Order Anura – Frogs

An order of four-limbed amphibians, most with a tadpole stage. They have a unique, short, tailless body and a broad head with a huge mouth.

Family Arthroleptidae, Squeakers and Tree Frogs:

Squeakers: Genus *Arthroleptis*. Small toad-like frogs associated with forest, living in leaf litter. They are very unusual; they lay eggs in damp soil which turn directly into little frogs, with no tadpole stage or metamorphosis.

Common Squeaker *Arthroleptis stenodactylus*



Remarks: A small frog, size up to 4.5 cm, with a boxy shape, brown with a black line through the eye. Found along the coast, sporadic records near Mt Kenya. The call is a short whistle, similar to a reed frog call.

Dwarf Squeaker *Arthroleptis xenodactyloides*



Remarks: Very small, size up to 2.3 cm, narrow-bodied, unlike the previous species, brown in colour with a black line through the eye. Found in southeast Kenya and along the coast. The call is a short chirp, like a cricket, it can be heard both by day and night.

Tree Frogs: Genus *Leptopelis*. Relatively large, big-eyed frogs associated with forest and well-watered savanna; despite the name not all live in trees. Until recently they were placed in the family Hyperoliidae. Have a distinctive vertical pupil, which is diamond-shaped in low light.

Witu Tree frog or Glade Tree Frog *Leptopelis concolor*



Remarks: Grows to 5 cm or slightly more. Shades of brown or pink. Occurs along the coast, inland to Kibwezi and up the lower Tana. The call is a distinctive ‘clack’, followed by two or three ‘yiiing’ sounds. Taxonomically it was originally grouped with *Leptopelis argenteus*.

Bocage’s Tree Frog *Leptopelis bocagii*



Remarks: Grows to 6 cm. Shades of brown or green. Occurs at mid-altitude in the central highlands and around Lake Victoria, also recorded from Moyale by Malcolm Largen. Despite the name, this frog lives on the ground; it emerges during heavy rain. The call is a slow ‘waah’.

Ornate Tree Frog or Yellow-spotted Tree Frog *Leptopelis flavomaculatus*



Remarks: Grows to 7 cm. Shades of brown or green, juveniles with yellow spots. Found along the coast and at Kitobo Forest near Mt. Kilimanjaro. The call is a cat-like 'weeooww'.

Large-headed Tree Frog *Leptopelis grandiceps* (previously known as *Leptopelis barbouri*)



Remarks: Grows to 4.5 cm. Shades of green, adult males have cobalt-blue vocal sacs. In Kenya, known only from the Shimba Hills. The call is a brief buzz.

Mackay's Forest Tree Frog *Leptopelis mackayi*

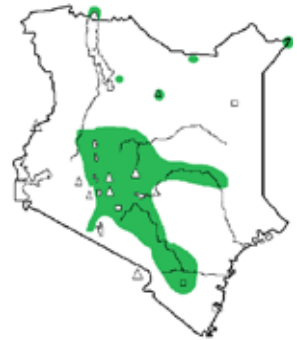


Remarks: Grows to 4 cm. Shades of brown or green, obvious white lip blotch. Known from Kakamega and Nandi Forests, western Kenya. The call is a low frequency staccato 'chakk'.

Family Bufonidae – Toads:

Large African Toads: Genus *Sclerophrys*. A genus of squat warty amphibians, originally placed in the genus *Bufo* and then *Amietophrynus*. Often common; a number of species occur in Africa. A large parotid gland, present behind the eye, secretes a white, toxic irritant. Toads hop rather than jump. Eggs deposited in long strings in water. Many toads are tolerant of urbanisation and agriculture. They often have a loud booming call, audible over a long distance, and hence cause disturbances in urban areas.

Garman's Toad *Sclerophrys garmani*



Remarks: A big toad, up to 11 cm, brown with paired back markings, often maroon in colour, and a big parotid gland. Widespread in central Kenya, sporadic in the north. The call is a repetitive, loud booming 'quaaaak'.



Guttural Toad *Sclerophrys gutturalis*



Remarks: A big toad, up to 12 cm, shades of brown with a pale cross on the head. Disjunct distribution in Kenya, at the coast, in the west and east of the rift valley; it is probably more widespread. The call is a slow and pulsing snore; almost like a machine gun.

Kerinyaga Toad *Sclerophrys kerinyagae*



Remarks: A fairly big toad, size up to 10 cm, brown or green, often vivid, with a pale cross on the head. In high central Kenya between 1500 and 2700m altitude, north to Saiwa Swamp. The call is a snore that decreases in frequency.

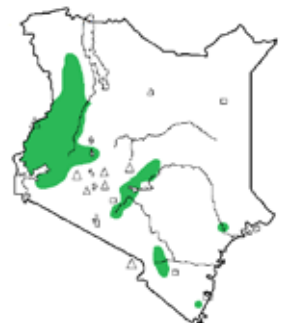


Kisolo Toad *Sclerophrys kisoensis*



Remarks: A fairly big toad, size up to 10 cm, brown or olive. The male becomes bright yellow when mating and afterwards. Found in high western and central Kenya. The call is a slow snore.

Flat-backed Toad *Sclerophrys pusilla* (was *Bufo maculatus*)



Remarks: A medium-sized toad, up to 8 cm, brown. Light cross on the head, parotid glands not elevated, so the back looks flat. Disjunct distribution in a range of habitats in west, east and southeast Kenya. The call is a raucous 'quork-quork'.

Common or Square-marked Toad or Egyptian Toad *Sclerophrys regularis*



Remarks: A big toad, up to 12 cm, colour variable; brown, rufous or dark grey. Back markings usually paired. Found in western Kenya, in savanna and semi-desert. The call is a slow snore with audible pulses.



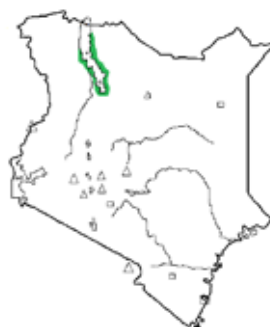
Steindachner's Toad *Sclerophrys steindachneri*



Remarks: A little toad, up to 5.5 cm, brown or grey; with red on the hind legs. The back is very warty. Occurs in woodland and savanna of coastal Kenya, extending up the major rivers, also found at Baringo. The call is a series of metallic knocks.

Turkana Toad *Sclerophrys turkanae*

Remarks: A little toad, up to 5 cm, brown. Known only from the shores of Lake Turkana, in Kenya. The call is a grating croak.



Desert Toad *Sclerophrys xeros*



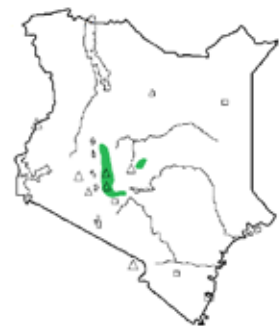
Remarks: A big toad, up to 10 cm, tan, brown or grey. There are bright red markings at the back of the thigh. Widespread in dry savanna and semi-desert. The call is like the hoot of a big owl.



Dwarf or Forest Toads:

Genus *Mertensophryne*. An African genus of small flat-backed frogs, originally in *Bufo*. They have no visible tympanum.

Lonnberg's Dwarf Toad *Mertensophryne lonnbergi*



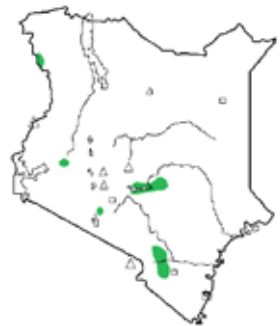
Remarks: A small toad, up to 4.5 cm, tympanum invisible; the eye may be bluish or green. Brown or grey, mating males are yellow. Lives in high altitude grassland, over 1800m, around and on the Aberdares and northeast of Mt Kenya. Males don't call, although they may squeak when handled.

Woodland or Bunty's Dwarf Toad *Mertensophryne micranotis*



Remarks: A very small secretive toad, up to 2.5 cm, tympanum invisible. Mottled browns, greys and rufous. Forest and woodland of the coast, sometimes active by day. Unusually, they have internal fertilisation and the eggs are laid in pockets of water in ground debris (snail shells, coconut shells) or tree holes. The males produce a soft chirp and sometimes clicks.

Taita Hills Dwarf Toad *Mertensophryne taitana*



Remarks: A small toad, up to 3.5 cm, tympanum invisible. A mixture of brown, rufous and grey; sometimes black, heavily mottled black below. In mid to low altitude savanna; Ukambani, Tsavo, Taita Hills. Disjunct records from Ologesaile, Songhor, northeast Kenya. Males don't call.

Eared Dwarf Toads:

Genus *Poyntonophrynus*. A genus of small flat-backed frogs, similar to the previous genus, but they have a visible tympanum.

Lugh Toad *Poyntonophrynus lughensis*



Remarks: A small toad, up to 4.5 cm. A mixture of brown rufous and grey. Widespread in low dry savannah and semi-desert of northern Kenya, also Tsavo. The call sounds like a goat bleating.

Parker's Toad *Poyntonophrynus parkeri*



Remarks: A small toad, up to 3.5 cm. A mixture of black, brown or grey with red warts. In Kenya known only from the southern rift valley south of Olorgesailie. The call is a high-pitched buzz.

Forest and Spray Toads:

Genus *Nectophrynoides*. A genus of small wide-headed montane toads, mostly in Tanzania, a single species known from Kenya.

Mt Kenya Forest Toad *Nectophrynoides*



Remarks: A small species, not formally described, and known only from a single 3 cm specimen, with spindly limbs and long toes, collected at Chogoria on the slopes of Mt Kenya.

Red Toads:

Genus *Schismaderma*. A genus with a single distinctive species.

Red Backed Toad *Schismaderma carens*

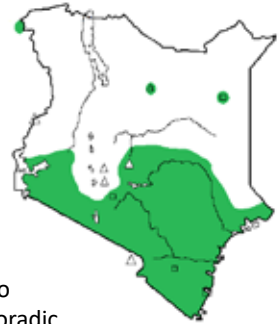


Remarks: A big toad, up to 9 cm, the back is rufous with two small paired markings and no parotid glands; the skin is smooth, not warty. Known only from the Mara and Olorgesaille area. The call is a very loud, long, reverberating deep whoop.

Family Hemisotidae – Snout Burrowers:

Snout Burrowers: Genus *Hemisus*. A genus of globular-bodied frogs with a hardened snout, used for digging. Originally it was thought there were two species in Kenya, but all records of the Guinea Snout Burrower, *Hemisus guineensis*, are now referred to *H. marmoratus*. One of only two species known to burrow head first.

Marbled Snout-burrower *Hemisus marmoratus*



Remarks: A smallish frog, up to 6 cm, back mottled and warty. Burrows snout-first, unlike other frogs. Very widespread in low to medium altitude savannah and woodland in southern Kenya, sporadic in the north. The call is a long insect-like buzz, like a mole cricket.

Family Hyperoliidae – Arboreal African frogs

Leaf-folding or Spiny Reed Frogs: Genus *Afrixalus*. A genus of small, attractive climbing frogs with a diagnostic diamond-shaped pupil and minute spines or sharp warts on the skin. Live in forest, woodland and moist savanna. Many lay eggs on leaves above water and they then fold the leaf and glue it closed to protect the eggs.

Delicate Leaf-folding Frog *Afrixalus delicatus*



Remarks: A small frog, up to 2.7 cm. Brown, yellow or tan with a brown flank stripe. Occurs at low altitude, along the coast, inland through Tsavo to Kibwezi. The call is a long buzz.

Spiny Leaf-folding Frog/Fornasini's Spiny Reed Frog *Afrixalus fornasinii*



Remarks: A relatively large *Afrixalus*, up to 4 cm. Colour variable; white, pink or brown, usually with a broad vertebral stripe. Found on the coast (no records between Malindi and the Tana River Delta). The call is a rapid series of clacks, like the firing of a tiny machine gun. Preys on the eggs of other frogs along with insects. The skin contains cardiotoxins.



Osorio's Leaf-folding Frog/Congo Spiny Reed Frog *Afrixalus osorioi*



Remarks: A small *Afrixalus*, up to 3 cm. Colour variable; white, pink or brown, with a broad stripe that divides. In the Kakamega and associated forests of the west. The call is a series of rapid clicks. A species of the Congo forest, just reaching western Kenya.

Striped Leaf-folding Frog/Four-lined Spiny Reed Frog *Afrixalus fulvovittatus*



Remarks: A small striped *Afrixalus*, up to 2.8 cm. Originally called *Afrixalus quadrivittatus*. Found in western Kenya, around the shore of Lake Victoria. The call is a short buzz followed by series of clicks.

Grassland Dwarf Leaf-folding Frog/Northern Pygmy Spiny Reed Frog

Afrixalus septentrionalis

Remarks: A small striped *Afrixalus*, up to 2.1 cm. Originally regarded as a variety of *Afrixalus brachynemesis*. In dry savanna of southeast Kenya. The call is a deep buzz.



Shimba Hills Leaf-folding Frog/Forest Spiny Reed Frog *Afrixalus sylvaticus*



Remarks: A small *Afrixalus*, up to 2.4 cm. Regarded by some as a variety of *Afrixalus stuhlmani*. In Kenya, known only from the Shimba Hills. The call is a series of rapid clicks.

Reed Frogs:

Genus *Hyperolius*. A genus of small, attractive climbing frogs, with horizontal pupils, many vividly coloured; in some forms the juveniles, males and females differ. They occur in reedbeds and marginal vegetation around water bodies in forest, woodland, moist and dry savanna. Living animals are often easily identified by a combination of locality, call and colour. Museum specimens are much more difficult to identify as the colours fade in preservative. At present, the status of some taxa is debated. One species, the Common Reed Frog, *Hyperolius viridiflavus*, shows a very wide variety of colour morphs; some authorities believe that the species needs to be split. So following our description of that species, we have given separate entries for four additional widespread morphs, or varieties, of *Hyperolius viridiflavus* that can easily be recognised in Kenya, although the fact remains that the calls of all the various morphs are much the same.

Argus Reed frog *Hyperolius argus*



Remarks: A small reed frog, up to 3.5 cm. Strongly sexually dimorphic; males are yellow or green, with tiny dark spots; females have big dark-bordered spots. Occurs along the entire coast, at water bodies in savanna, grassland and forest. The call is a series of thin, reedy 'chikk' sounds.

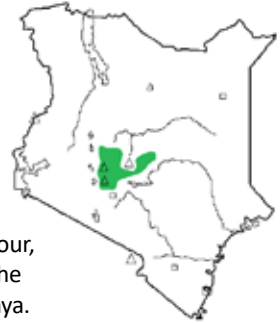
Cinnamon-bellied Reed frog *Hyperolius cinnamomeiventris*



Remarks: A small reed frog, up to 2.8 cm. Variable in colour, females often green, the males usually have a distinct lateral stripe. Occurs in the savanna and forest of high western Kenya. The call is a series of short clicks.



Silver-bladdered Reed frog *Hyperolius cystocandicans*



Remarks: A relatively large reed frog, up to 3.6 cm. Variable in colour, mustard to marbled. The silvery-white bladder is visible through the belly skin. Occurs in the savanna and grassland of high central Kenya. The call is a series of short, quiet clicks, occasionally drawn out.

Eastern Sharp-nosed Reed frog *Hyperolius microps*

Remarks: A small frog, up to 2.45 cm. Occurs along the coast, at water bodies in savanna, grassland and forest. Originally placed in the *Hyperolius nasutus* complex, as was the following species. The call is a series of rapid clicks; ziiip, ziiip, ziiip.



Kim Howell's Reed frog *Hyperolius howelli*



Remarks: A small reed frog, up to 2.6 cm. Usually green, with a pale lateral stripe, some specimens brownish-green. Occurs in two disjunct populations; in the high savanna of central and western Kenya, The call is a melodic ziiip, ziip. Originally in the *Hyperolius nasutus* complex.



Kivu Reed frog *Hyperolius kivuensis*



Remarks: A relatively large reed frog, up to 4 cm. Colour variable, but usually has fragmented black stripe through eye. Occurs in the high savanna and woodland of western Kenya. The call is a very brief, harsh chirp.

Side-blotched or Side-striped Reed frog *Hyperolius lateralis*



Remarks: A medium sized reed frog, up to 3 cm. Colour variable, usually with an undulating side-stripe, although some males and juveniles are green or brown, sometimes with speckling. Occurs in the high savanna and woodland of western Kenya. The call is a very brief, harsh creak.

Mountain Reed frog /Kenya Montane Reed Frog *Hyperolius montanus*



Remarks: A medium-sized reed frog, up to 3.5 cm. Colour astonishingly variable, some uniform, others striped. Lives in the high country, at altitudes between 2000 and 3 3000m, including montane moorland, in central Kenya, found also on the Mau Escarpment of the Rift Valley. The call is a series of short chirps. Sometimes active by day at very high altitude.

Parker's Reed frog *Hyperolius parkeri*



Remarks: A little reed frog, up to 2.8 cm. Usually green, but sometimes brown or yellow, with a dark-edged stripe. Occurs along the coast from Lamu southwards, at ponds in savanna and forest. The male, uniquely, produces the call (a long, loud trill) with head downwards.

Water Lily Reed frog *Hyperolius pusillus*



Remarks: A tiny reed frog, up to 2.1 cm. Usually green, but sometimes white or yellow, almost translucent; the body organs can sometimes be seen through the skin. Most have a dark punctuated line between the eyes and the nose. Occurs all along the coast, inland on the Tana River and Sabaki/Galana River, and an isolated Ukambani record. The call is a series of gentle, rather fuzzy clicks or taps.

Shimba Hills Reed frog *Hyperolius rubrovermiculatus*



Remarks: A medium-sized reed frog, up to 3.2 cm. Females vividly coloured; males duller. Endemic to Kenya, known only from the Shimba Hills. The call is a scream.



David Sheldrick's Reed frog *Hyperolius sheldricki*

Remarks: A medium-sized reed frog, up to 3.5 cm. Never photographed alive. Endemic to Kenya, known from Aruba Dam, Kakokeni and the Tana Delta, and probably intervening areas. The call is a brief whistle.



Spotted Reed frog *Hyperolius substriatus*



Remarks: A large reed frog, up to 4.3 cm. Males with a stripe, females spotted. In Kenya known only from the Kitobo Forest. The call is a series of loud clacks.

Tinker Reed frog *Hyperolius tuberilinguis*



Remarks: A large reed frog, up to 3.8 cm. May be yellow, various shades of green, brown or ivory. Occurs on the coastal strip, and between Kitobo and the Taita Hills. The call is a sharp double or triple click or tap.



Common Reed frog *Hyperolius viridiflavus*



Remarks: A fairly small reed frog, up to 2.5 cm. May be yellow, green, brown, grey or some mix, often spotted, the unexposed limbs are red. The variation in colour indicates that several species may be involved; the taxonomy is unclear; following this account are four further colour varieties of this species, treated separately. Widespread in southern Kenya, at a range of altitudes, also on Marsabit. All lay eggs in water. The call is a brief, melodic and distinctive repetitive reverberating tink.

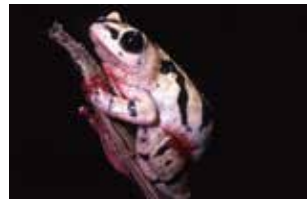
Athi River Reed frog *Hyperolius viridiflavus* variety *ferniquei*



Remarks: A medium-sized reed frog, up to 2.8 cm. Variable in colour, males with a vague hourglass pattern on the back, females pale or grey, speckled. Occurs in the savanna, light woodland and grassland of southeast Kenya, particularly around the Athi River basin. The call is a melodic, distinctive tink.

Peter's Reed frog/Taita Reed Frog

Perolius viridiflavus variety *glandicolor*



Remarks: A medium-sized reed frog, up to 3 cm. Variable in colour, white, brown or black, spotted or striped. Occurs in the savanna, woodland and forest of the Taita Hills and the surrounding savanna of southeast Kenya. The call is a brief melodic tink. Note: the name *glandicolor* has been used for several taxa; we use it here as originally used by Wilhelm Peters to describe the *Hyperolius* of the Taita Hills.



Kenya Spotted Reed frog *Hyperolius viridiflavus* variety *pantherinus*



Remarks: A fairly small reed frog, up to 3 cm. May be yellowish or white, with black speckling, occasionally uniform. In high central Kenya, and the Mathews Range. The call is a melodic tink.



Mary's Reed frog *Hyperolius viridiflavus* variety *mariae*



Remarks: A small reed frog, up to 2.5 cm. Colour variable, some Tanzanian examples have a black lateral streak. Occurs along the Kenya coast. The call is a very brief melodic tink. The colour phase of the right hand picture (a juvenile male) is common to many forms of the *viridiflavus* complex.

Wot-wots or Kassinas:

Genus *Phlyctimantis*. A small genus of small climbing frogs, with vertical pupils, some vividly coloured. One species of *Kassina* has just been reclassified into this genus.

Red-legged Kassina or Red-legged Wot-wot

Phlyctimantis maculatus (formerly *Hylambates* or *Kassina maculata*)



Remarks: Reaches 7 cm or slightly more. Vivid red on the limb junctions. Occurs along the coast. The call is distinctive, short 'wikk', every two seconds or so, frequently from floating in the water or from a waterside bush.

Kassinans or Running Frogs:

Genus *Kassina*. A genus of small, attractive ground-dwelling frogs, with vertical pupils; toe pads not expanded into discs.

Senegal Kassina *Kassina senegalensis*



Remarks: Adults grow to 5 cm or slightly more. Spotted, striped or a mixture; usually spotted in dry north (such animals sometimes called *Kassina somalica*). Juveniles tend to be pinkish. Common and widespread in savanna, sporadic in dry north. The call is a distinctive liquid 'quoip', repeated every two seconds or so, sometimes made from concealment.

Spotted Kassina *Kassina maculifer*



Remarks: Reaches 4.5 cm or slightly more, toe tips moderately expanded into discs. Goldish tan, with a distinctive hourglass marking on the back and dark spots. Known only from Wajir and Banissa in semi-desert of the dry northeast but might be more widespread. The call is a brief rising note.

Family Microhylidae – Narrow-mouthed Frogs:

Rubber Frogs: Genus *Phrynomantis*. A small genus of usually vividly coloured terrestrial frogs.

Red-banded Rubber Frog *Phrynomantis bifasciatus* (previously *Phrynomerus bifasciatus*)

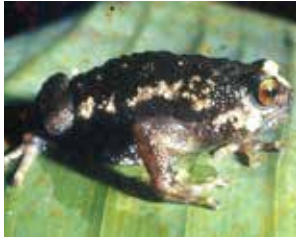


Remarks: Maximum size 6.5 cm or slightly more. Dark with red or pink bands. Occurs on the coast, inland through Ukambani; also known from Meru, Meru National Park and Lake Baringo. The call is a distinctive long, electronic-sounding trill. Produces a toxic skin secretion which can cause swelling and neurotoxic effects if it gets on grazed skin or enters a cut.

Family Brevicipitidae – Rain Frogs:

Warty Frogs: Genus *Callulina*. A small genus of toad-like frogs with a finely warty skin. Usually found buried underground or in vegetation heaps but may sometimes climb and call from a tree. Their eggs are laid in a membrane in leaf litter and develop directly into little frogs, without a tadpole stage.

Taita Hills Warty Frog *Callulina dawida*



Remarks: Grows to 5.5 cm. Known only from the remaining forests of the Taita Hills, above 1400 m. The call is a long trill.

Krefft's Warty Frog *Callulina krefftii*



Remarks: Grows to 4.7 cm. In Kenya, known only from the Shimba Hills (the specimens shown were photographed in the Usambara Hills, Tanzania). The call is a rolling trill, lasting over 3s.

Family Pipidae – Tongueless Frogs:

An ancient but highly specialised group of almost wholly aquatic frogs, lacking tongues. They feed below the surface, and are confined to the southern hemisphere, in Africa and South America.

Clawed Frogs: Genus *Xenopus*. Widespread in Africa. Relatively large flat frogs, some reaching 10 cm, with claws on three toes; occur in all kinds of water bodies, even brackish. Feed and breed underwater, but will migrate in huge groups overland to find a fresh water source. In all species the males produce mating calls underwater.

Northern Clawed Frog *Xenopus borealis*



Remarks: A medium-sized aquatic frog, up to 7.5 cm, usually grey or back, occasionally spotted; pale or yellowish underneath. Found in western, southern and parts of south-eastern Kenya, also on Mt. Marsabit in the north. The call is described as a series of slow clacks.

Lake Victoria Clawed Frog *Xenopus victorianus*



Remarks: A medium-sized aquatic frog, up to round 8 cm, usually grey, yellowish or green, dark or light, sometimes with large irregular spots. Found in western Kenya and the Lake Victoria basin, at altitudes between 800 and 2 500 m. The mating call (made underwater) is distinctive; like someone tapping briskly on a china plate with a coin.

Muller's Clawed Frog *Xenopus muelleri*



Remarks: A medium-sized to large aquatic frog, reaching 9 cm. Usually olive to brown above, sometimes with large irregular spots, yellow below. Found in southeastern Kenya and along the coast. May occupy even tiny water bodies, puddles, drains etc. Their skins contain a chemical that causes vomiting, presumably as a defence against predation. The call is a distinctive, short pulsed series of grunts.

Family Pyxicephalidae – Bullfrogs, River Frogs, Cacos and Sand Frogs

In recent years, improved DNA and morphological analysis, along with more material from the field has led to major re-analyses of evolutionary relationships; African frogs are no exception. In many cases, this has led to the discovery of new genetic relationships between frogs that were thought to be unrelated; this new approach is reflected below; with brief notes indicating the original classification.

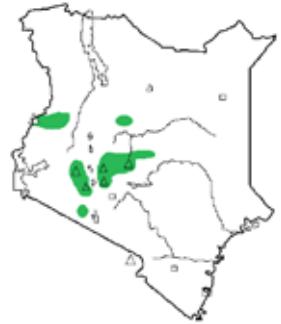
River Frogs: Genus *Amietia* (previously in *Rana* and *Afrana*). Relatively large frogs, similar to the 'true frogs' (*Rana*) of Europe or the *Lithobates* frogs of the Americas. Up to 11 cm in length. Unusually for Africa they are often associated with permanent water, including man-made water sources, and thus breed throughout the year. They look similar to rocket frogs (*Ptychadena*) but lack the dorso-lateral glandular folds diagnostic of that genus.

Nutt's River Frog *Amietia nutti* (previously called *Afrana angolensis* and *Rana angolensis*)



Remarks: A large river frog, up to 12 cm long, usually brown or olive, sometimes spotted to a greater or lesser extent. Occurs in western, southwestern and central Kenya. Usually found near streams and man-made water sources; frequently found sitting on the banks at night. Often common. The call is biphasic; clicks and creaky croaks; the croaks sound like a small mammal groaning.

De Witte's River Frog *Amietia wittei*



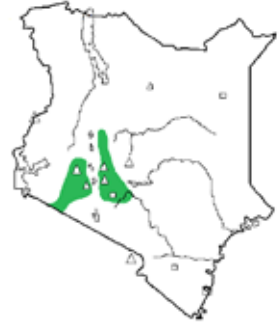
Remarks: A fairly large frog, up to 8 or 9 cm, usually shades of brown, sometimes pinkish, often with elaborate flank marbling, a useful field character distinguishing this species from *Amietia nutti*. A high altitude species, occurring between 1200m and 3500 m altitude in high central and western Kenya. Active by day and night. Shelters under ground cover near streams. The call is undescribed.

Amani River Frog *Amietia tenuoplicata*



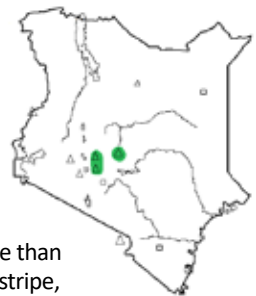
Remarks: A fairly large frog, up to 6 cm, usually shades of brown, sometimes pinkish, legs usually barred. An Eastern Arc species, in Kenya known only from the Taita Hills, at altitudes between 1000 and 2000 m, where it has been found near streams, so probably tied to water like other Kenyan members of the genus. The call does not seem to be documented.

Plimpton's Dainty Frog/Plimpton's Caco *Cacosternum plimptoni*



Remarks: A very small frog, rarely more than 2.5 cm, usually shades of brown or green, sometimes with a vertebral stripe, underside usually spotted. A highland species, in Kenya known from both sides of the rift valley, at altitudes between 1000 and 2000 m. The call is a rapid series of high-pitched clicks or taps in pulses of 6 or 7, like a steel nail tapping a metal plate.

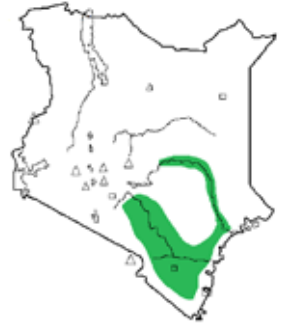
Kinangop Dainty Frog/Kinangop Caco *Cacosternum kinangopensis*



Remarks: A very small frog, similar to the previous species. Rarely more than 2.5 cm, usually shades of brown or green, sometimes with a vertebral stripe, underside spotted. A high altitude species, endemic to Kenya and known only from the Kinangop Plateau, the Aberdares and Mt Kenya, at altitudes above 2 400m. Calls from the water level; a four-pulsed note, differing only from *Cacosternum plimptoni* in its frequency; further work is needed to better define these two similar, nearly-overlapping species.

African Bullfrogs: Genus *Pyxicephalus*. Huge squat frogs, the largest in Kenya, up to 12 or 13 cm, in eastern Kenya. They show a remarkable colour change as they grow larger. The taxonomy is confused; the two species recorded from Kenya might not actually be genetically distinct

Edible Bullfrog *Pyxicephalus edulis*



Remarks: A large frog, up to 13 cm length. Changes in colour as it grows; the four photographs indicate decreasing age clockwise from the adult top left). Widespread in low eastern Kenya but replaced on the coast by the East African Bullfrog. The call is a short 'wapp-wapp', like a small dog yapping.

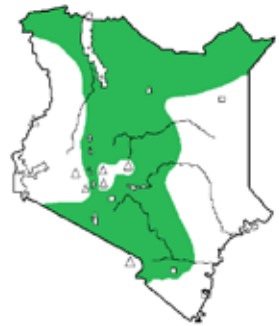
East African Bullfrog *Pyxicephalus angusticeps*



Remarks: A large frog, up to 15 cm length. Similar to the previous species in ontogenic colour/pattern changes. Occurs along the coast. The call is a high-pitched 'wapp-wapp', indistinguishable from the previous species; indicating doubts as to this species' validity.

Sand Frogs: Genus *Tomopterna*. Medium-sized, stout, attractive frogs, sometimes warty, but the parotid gland diagnostic of toads is always absent. A prominent flange-like metatarsal tubercle for burrowing during drought conditions is always present on the foot. Found in a range of habitats including very dry ones, but rarely in forest or at altitude. Considerable individual variation together with the groups' enormous geographic range (from South Africa to the Equator) has resulted in much confusion as to the identity and validity of many of the described taxa. Given that the distributions of all of the Kenya species overlap geographically, it is highly unlikely that the various scientific names actually denote genetically/topographically isolated species. Sand frogs are very much in need of a modern treatment throughout its range. What follows is a list of the various extant species names of Kenyan populations and their distributions.

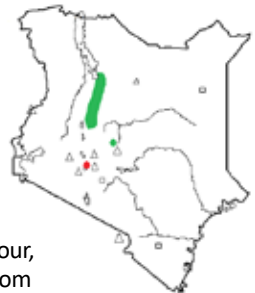
Cryptic Sand frog *Tomopterna cryptotis*



Remarks: A small warty robust frog, up to 6 cm length. Very variable in colour and pattern, usually a mix of browns and grey, often with rufous or dull green. Widespread in many habits in Kenya. The call is a series of high-pitched squeaks.



Gallmann's Sand frog *Tomopterna gallmanni*



Remarks: A small warty fat frog, up to 5 cm length. Very variable in colour, usually a mix of browns and grey, often with rufous blotches. Known from Laikipia and a handful of localities north from Ol Ari Nyiro Ranch, east of Baringo, to Maralal and Baragoi. The call is a series of rapid knocking sounds.

Red Sand frog *Tomopterna luganga*



Remarks: A small warty fat frog, up to 5.2 cm length. Variable in colour, usually a mix of browns and rufous. Known from Lake Bogoria; probably present in the Maasai Mara as it is known from Serengeti. The call is a series of between 1 and 11 notes, 5 to 6 per second, of frequency around 1 kHz.

Maasai Sand frog *Tomopterna monticola*

Remarks: A small warty fat frog, 4.2 cm in length. Known only from a resurrected museum specimen from Olangarua Village, in southern Kenya west of Lake Magadi. It is said to be warty, brown and green. The call is unknown.

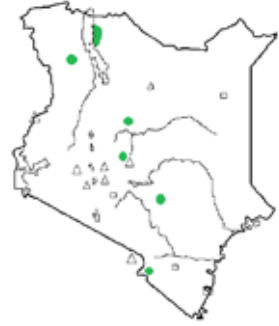


Tandy's Sand frog *Tomopterna tandyi*



Remarks: Remarks: A small warty fat frog, 5 cm in length. Sporadically recorded from a wide range of localities in Kenya, mostly at low altitude. The call is a series of high-pitched metallic but melodious notes.

Wamba Sand frog *Tomopterna wambensis*



Remarks: A small warty fat frog, 5 cm in length. Sporadically recorded from a wide range of localities at low altitude in dry areas of Kenya. The call is a rapid series of high-pitched notes.



Family Ptychadenidae – Ridged or Rocket frogs and allies

A small family of three genera that share common features of the skull and clavicles; the largest and nominate group, the rocket frogs, are very dissimilar to the other two.

Ornate Frogs: Genus *Hildebrandtia*. Large squat, attractive savanna frogs, somewhat similar to *Tomopterna* but the burrowing spade (metatarsal tubercle) is absent. Two species occur in Kenya, but neither is well known or studied as they are apparently burrowers, remaining underground in the dry season.

Northern Ornate Frog *Hildebrandtia macrotypanum*



Remarks: A chunky, squat frog, up to 5 cm in length. Known only from a handful of records in southeastern Kenya, but also recorded just inside Ethiopia, northeast of Moyale, and on the Juba River in Somalia, so probably in northeastern Kenya. The call is a loud, short whoop.

Common Ornate Frog *Hildebrandtia ornatum*



Remarks: A chunky, squat frog, up to 7 cm in length; males with a contrasting black and white pattern on the throat. Known only from a handful of records in the savanna of southeastern Kenya, from the Athi Plain and Ol Donyo Sabuk south and east along the Athi River into Tsavo National Park. The call is a loud, short bellow, 'wheeiik'.



Rocket, Ridged, Grass or Sharp-nosed Frogs: Genus *Ptychadena*. Medium to fairly large frogs, some reaching 9 cm length, easily recognised by their long snouts, long slender hind legs, a series of unbroken dorsal and lateral skin ridges and their prodigious leaps. Frequently found during the day hiding in the grass near the water; when disturbed they leap away and burrow into the vegetation. Breeding is usually at night. Some species are very tolerant of urbanisation and can exist in relatively polluted water. This genus is made up of rather similar species, is widespread throughout Africa and in need of systematic clarification.

Anchieta's Rocket Frog *Ptychadena anchietae*



Remarks: A sharp-nosed frog, up to 6 cm in length. Very widespread in Kenya, from sea level to 1800 m altitude or more, in a wide variety of habitats. The pale triangle on the snout and irregular black flank speckling between the legs are good field characters. The high-pitched call is a repetitive 'reek, reek, reek', heard by day and night in the rainy season.

Mahnert's Rocket Frog *Ptychadena mahnerti*



Remarks: A small sharp-nosed frog, up to 5cm in length. Various shades of brown, rufous or beige, sometimes a vertebral stripe. Sporadically distributed in high central and western Kenya, usually at altitudes above 1 800m. The high-pitched call is a far-carrying typical, *Ptychadena* 'trill'. Little is known of its habits.



Nile Rocket Frog *Ptychadena nilotica*



Remarks: Reaches nearly 7 cm in length. Widespread over much of southern Kenya; records sporadic in north but probably more widespread. Quite tolerant of urbanisation and polluted water. The high-pitched call is a repetitive quek, quek, interspersed with a series of clucks.

Taxonomic Note: According to Max Dehling and Ulrich Sinsch, most of the Kenyan frogs originally referred to as *Ptychadena mascareniensis*, the Mascarene Rocket Frog, are probably referable to this species, *Ptychadena nilotica*.

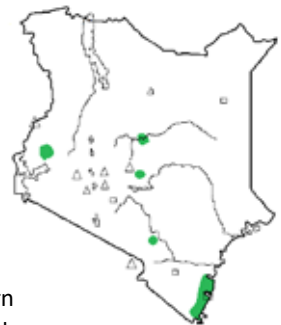
Mozambique Rocket Frog *Ptychadena mossambica*



Remarks: Reaches 5.5 cm in length. Widespread in south-eastern Kenya and the coast, in savanna and woodland. When disturbed it jumps away from the water into vegetation and rapidly crawls down to hide itself. The call is a distinctive series of quacks, like the sound of a little bulb horn.

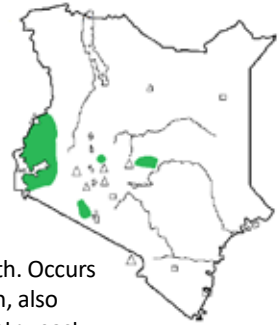


Sharp-nosed Rocket Frog *Ptychadena oxyrhynchus*



Remarks: A large squat gnome-like frog, reaches nearly 9 cm in length. Sporadically distributed on the south coast, in southeastern and eastern Kenya, also Kakamega; probably more widespread but overlooked. Can be brown or rufous, usually a pale or rufous triangle on the snout. A tremendously powerful jumper; according to the Guinness Book of World records it has the longest jump of any frog in the world. Breeds in any standing water and tolerant of polluted water. The call is a loud, rapid repetitive trill.

Grassland/Striped Rocket Frog *Ptychadena porosissima*



Remarks: A streamlined-looking frog. Reaches about 5 cm in length. Occurs in western Kenya, Lake Victoria basin, north to Kitale and Mt Elgon, also from the Loita Hills and Nguruman Escarpment, and the high country east of Mt Kenya. The males call while concealed below vegetation in shallow water; the call is a repetitive series of high-pitched squeaks.

Schilluk Rocket Frog *Ptychadena schillukorum*



Remarks: Reaches about 5 cm in length. Occurs along the coast and in southeast Kenya, sporadic records from Olorgesailie and Baringo. The males call while floating in vegetation tangles. The call is a series of clicks.

Small Rocket Frog *Ptychadena taenioscelis*

Remarks: A very small ridged frog, maximum length 4 cm. In Kenya recorded only from Kakamega Forest. The males call from flooded grassy areas; the call is a rapid series of fluctuating quacks.



Family Phrynobatrachidae – Puddle Frogs and allies:

A fairly recently proposed family of four genera: three single-species (monotypic) and one of over eighty currently recognized species, sub-Saharan in distribution.

Puddle Frogs: Genus *Phrynobatrachus*. A large genus of small frogs, most are 2-3 cm in length, mostly brown to gray, with warty skin; most species have a small metatarsal tubercle on the hind leg, and the mid-dorsal line (raphe) of skin defining species of the similar *Arthroleptis* is always absent; often occurring and breeding in temporary water such in puddles, even tiny ones on rock surfaces or on fallen trees; males of many species produce a buzzing or squeaky non-melodic call that can often be heard in the day as well as at night. The taxonomy of this group is very poorly understood, and very much in need of clarification, especially since members of this group are found throughout the Afrotropical region.

East African Puddle Frog *Phrynobatrachus acridoides*



Remarks: A small puddle frog, maximum length 3 cm. In Kenya recorded from the savanna and woodland of the southeast and the coastal strip, sporadic records from other places in the savanna. The males call from vegetation in shallow water; the call is a repetitive buzz, like the sound produced by drilling into a wall.

Bubbling Puddle Frog *Phrynobatrachus bullans*



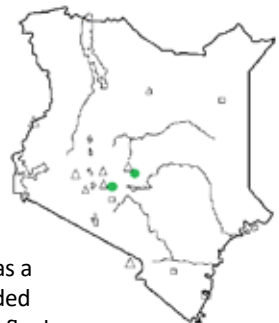
Remarks: A small puddle frog, maximum length 2.7 cm. In Kenya recorded only from Homa Bay and (provisionally) the Maasai Mara. The male's call is a long series of bubbling notes.

Grauer's Puddle Frog *Phrynobatrachus graueri*



Remarks: A small puddle frog, maximum length 2.5 cm. Sometimes has a vertebral stripe. In Kenya recorded from the forest and forest fringes of the west, The male's call is described as a click, or a 'tink-tink', but has not been formally analysed.

Irangi Puddle Frog *Phrynobatrachus irangi*



Remarks: A relatively large puddle frog, maximum length 5 cm. Has a distinctive rufous or beige area on the snout. In Kenya only recorded from the Irangi forest on Mt Kenya and Kimande on the southeast flank of the Aberdares. The males produce a rasping call during the day.

Kakamega Puddle Frog *Phrynobatrachus kakamikro*

Remarks: A small puddle frog, maximum length 2 cm. In Kenya originally described from the Kakamega Forest, but recorded by the National Museums of Kenya team on Mt Elgon, and also Uganda. Quite variable in colour, brown or green.



Kenya Puddle Frog/Upland Puddle Frog *Phrynobatrachus keniensis*

Remarks: A small puddle frog, maximum length 2.6 cm. Occurs in high central Kenya, the central Rift Valley, a few records from the west. Quite variable in colour, brown, gold or blotched, sometimes with a vertebral line. The call is a series of clicks, reminiscent of the sound of a coin dropping.



Kinangop Puddle Frog *Phrynobatrachus kinangopensis*

Remarks: A small puddle frog, maximum length 2.4 cm. Occurs on the Kinangop Plateau and Aberdares, but also recorded from Ondiri Swamp near Kikuyu town. Quite variable in colour, usually brown, with a dark streak behind and below the eye; sometimes a fine vertebral stripe. The call has not been recorded.



Mababe Puddle Frog *Phrynobatrachus mababiensis*



Remarks: A small puddle frog, maximum length 2.1 cm. Kenya distribution disjunct; found in western Kenya, from the lakeshore south to the Maasai Mara, also on the south coast. Very variable in colour, with or without vertebral stripes and bands. The call is a number of cricket-like long buzzes, interspersed with repetitive taps or clicks.

Snoring Puddle Frog, Natal Puddle Frog *Phrynobatrachus natalensis*



Remarks: Reaches 4 cm. Widespread (and often common) in southern and western Kenya, sporadic records from the north. Colour variable, usually brownish and often with a broad or narrow red or green vertebral stripe. Calls by day and night from puddles and ditches in savanna in the rainy season. The call is a slow, quiet, saw-like snore, several frogs calling together can render the mating call seemingly continuous.

Pale Puddle Frog *Phrynobatrachus pallidus*

Remarks: An apparently small puddle frog, reaching 1.75 mm in length. Never photographed alive; it is grey to brown above with darker markings forming a cross or W above the shoulder blades. Sporadic coastal records include Lake Kenyatta (east of Witu), near Malindi and Kaloleni. The call is a prolonged buzz, ending with metallic ticks.



Scheffler's Puddle Frog *Phrynobatrachus scheffleri*



Remarks: A small puddle frog, maximum length 2.2 cm. Kenya distribution disjunct; found in central and southeastern Kenya, sporadic records in the north and at Kakamega. Usually brown, with or without a vertebral stripe. The call is a long trill.

Unguja Puddle Frog *Phrynobatrachus ungujae*



Remarks: A tiny, very warty puddle frog, maximum length 1.6 cm. In Kenya known only from the Arabuko-Sokoke Forest, but probably occurs further south along the coast, as it is found in Tanzania. Usually brown or grey, with or without a broad vertebral stripes. The call is a long buzz, terminated by ticks.

Family Ranidae – True or Typical Frogs:

White-lipped Frogs: Genus *Amnirana* (previously in *Hylarana*). A genus of relatively large frogs, both Kenyan species have a white glandular upper lip; aquatic in general appearance but with slightly expanded, upwardly- tilted finger and toe tips.

Forest White-lipped Frog *Amnirana albolabris*



Remarks: A big frog, maximum length 7.5 cm. A rainforest species, in Kenya known only from the west, around the Lake Victoria basin, north to Kitale. Usually shades of brown, with an obvious white lip; frequents the edge of water bodies. The call is a rising squawk, reaching a crescendo.

Galam White-lipped Frog *Amnirana galamensis*



Remarks: A big frog, maximum length 8.5 cm with a disjunct distribution in Kenya; found along the coastal strip and in the Kakamega Forest area. Usually shades of brown or gold, the back is mottled with black to a greater or larger extent. The males call while floating, with two calls, a high-pitched mellow, almost cat-like whoop, and a low grunt.

Family Dicoglossidae – Fork-tongued or Groove-crowned Frogs:

Crowned Bullfrogs: Genus *Dicoglossus*. A genus of five species, in Africa and Asia.

Eastern Groove-crowned Bullfrog *Hoplobatrachus occipitalis*



Remarks: A huge frog, maximum length 16 cm. Widespread in the west, in all types of habitat (forest, savanna, semi-desert), in permanent and temporary water bodies. Green, olive or grey above. Floats at night in the water, and can jump across the surface (skittering) if pursued. The call is a loud, brief, rapidly repeated, nasal squawk or grunt.



Family Rhacophoridae – Foam-nest Frogs:

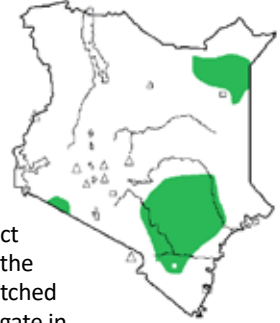
Foam-nest Frogs: Genus *Chiromantis*. A genus of distinctive, long-limbed frogs, belonging to a family otherwise confined to Asia. A unique breeding behaviour, in which adults make an elevated foamy white nest in which eggs are deposited. Skin has been shown to be dehydration tolerant, effectively “waterproof.” All species listed here capable of blanching to extreme white, capable of perching in direct sunlight during the day. There is ongoing debate on the true status of *Chiromantis petersi* and *C. kelleri*; some experts do not accept they are separate species.

Southern Foam-nest Frog *Chiromantis xerampelina*



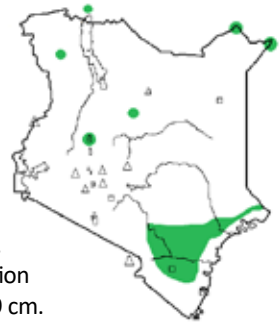
Remarks: A fairly large frog, reaching 9 cm. Occurs along the coastal strip and up the Tana River, in temporary or permanent water bodies. White or blotched brown above, depending on the circumstances. The males congregate in mating, and the females release a secretion that is beaten into foam with the legs. The call is a series of quiet creaks and pig-like grunts.

Peters' Foam-nest Frog *Chiromantis petersi*



Remarks: A small member of the genus, reaching 6.5 cm. A disjunct distribution, it is found in the Mara, Ukambani-Tsavo and parts of the northeast, in temporary or permanent water bodies. White or blotched brown above, depending on the circumstances. The males congregate in mating, and the females release a secretion that is beaten into foam with the legs; often in a deep hole. The call is a series of quiet creaks and grunts.

Keller's Foam-nest Frog *Chiromantis kelleri*



Remarks: This frog was formerly a subspecies of the previous form, *Chiromantis petersi*, and its status is not fully resolved; the distribution patterns indicate the two may not be separate species. It grows to 9 cm. Widespread in eastern Kenya, seemingly sporadic in the dry north. White or blotched brown above, depending on the circumstances. The males congregate in mating, like other members of the genus. Their foam nests are common in Tsavo East. The call is a series of slow croaks, coupled with isolated clicks.

Family Petropedetidae – Torrent Frogs

Torrent Frogs: Genus *Petropedetes*. A genus of small frogs living in flowing streams.

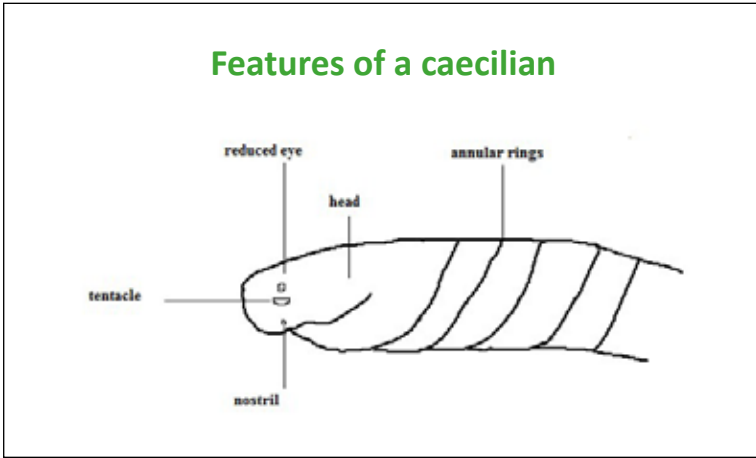
Mt Elgon Torrent Frog *Petropedetes dutoiti*

Remarks: A small stocky frog, reaching 3 cm. Eyes prominent. Brown with darker markings; it has long limbs with distinct discs at the end. Known only from the streams on the higher slopes of Mt Elgon, and not collected since 1962, never photographed.



Order Gymnophiona – Caecilians

An order of circumtropical limbless amphibians resembling earthworms. Of the more than 180 known species, four are aquatic; the vast majority of caecilians live underground, in moist soil and sand or leaf litter frequently near water sources; they sometimes shelter in decomposing logs. The diagram below illustrates some general caecilian features; within Kenya, most can be identified by locality alone.



Family Herpeliidae:

East African Caecilians: Genus *Boulengerula*. A genus of relatively large caecilians, with a transverse vent. Usually pink or purplish in colour, with no visible eyes; living in soil, decomposing logs, root tangles etc. Five species are formally described from Kenya, but there are likely more to be discovered, an unidentified form has been recently reported from Ngulia Hill in Tsavo West National Park, a hill range from which no caecilian records exist.

Changamwe Caecilian *Boulengerula changamwensis*

Remarks: A small caecilian, reaching 23 cm in length. Usually pink or purple-pink. Known only from the moist coastal strip, in forest and farmland, from Kilifi southwards to the Shimba Hills.



Denhardt's Caecilian *Boulengerula denhardtii*



Remarks: Reaches a length of 30 cm. A slender, light brownish-pink caecilian. Originally described from 'Tana Region' during the German occupation, thus the area around Witu. Recently rediscovered near Lake Kenyatta in the Tana Delta.

Sagalla Hill Caecilian *Boulengerula niedeni*

Remarks: Reaches a length of 30 cm. A slender, light brown to dark grey caecilian, the colour darkening with altitude. Known only from Sagalla Hill, near Voi, at altitudes between 1000 and 1500 m.



Taita Hills Caecilian *Boulengerula taitana*

Remarks: Reaches a length of 36 cm. A slender blue-grey caecilian, on close examination the annuli are black with light speckling and blue annular grooves, the head is pink; known from farms and forest in the Taita Hills, and also Mt Kasigau.



Spawls' Caecilian, Nyambene Hills Caecilian *Boulengerula spawlsi*

Remarks: Reaches a length of 30 cm. A slender pink caecilian, with paler grooves and head. Known only from the mid-altitude Ngaia Forest (1300 m), below the Nyambene Hills; where it is found in logs and moist soil but also under ground debris.



Family Dermophiidae:

African Caecilians: Genus *Schistometopum*. A genus of two species, with a remarkable disjunct distribution, coastal East Africa and Sao Tome Island in the Atlantic Ocean. This is the only Kenyan species where the eyes are not concealed under bone.

Floodplain Caecilian *Schistometopum gregorii*

Remarks: A stout caecilian, reaching a length of 36 cm. Black or brownish in colour, sometimes with a hint of pink. In Kenya, known from the floodplains of the Tana River Delta, and distinguished by colour from the only other caecilian from the Tana Delta, *Boulengerula denhardti*, which is pink. The only other member of this genus is endemic to the Atlantic Ocean island of Sao Tome in the Atlantic Ocean.



Family Scolecomorphidae:

Tropical African Caecilians: Genus *Scolecormorphus*. A genus of three species, one recently recorded in Kenya. Juveniles have eyespots but they disappear in adults. Can be identified by its distinctive colouration.

Ribbon Caecilian *Scolecormorphus vittatus*

Remarks: A slim caecilian, reaches a length of 30 cm. Black above, lower flanks and underside pink. In Kenya, recently recorded from the Shimba Hills in Kenya.



Acknowledgements and Picture Credits

A large number of herpetological photographers kindly allowed us the use of their images. They are listed below, with details, and we offer our gratitude to them all:

Bio-Ken Archive (Leptopelis concolor TR, Sclerophrys steindachneri TR, Afrixalus fornasinii TL, Hyperolius argus TL, TR, Phlyctimantis maculatus TR, Xenopus muelleri TR, Tomopterna cryptotis TC, Phrynobatrachus acridoides TL, Phrynobatrachus mababiensis. Chirornantis xerampelina BL), **Beryl Bwong** (Callulina dawida TL), **Alan Channing** (Ptychadena schillukorum TR), **Zarek Cockar** (Hemisis marmoratus TL, Cacosternum plimptoni TL), **Rolf Davey** (Hyperolius glandicolor TR), **Florian Finke** (Mertensophryne micranotis TL, BL, Phrynomantis bifasciatus, Phrynobatrachus acridoides TR), **Eli Greenbaum** (Phrynobatrachus graueri), **Olivier Hamerlynck, James Harvey** (Afrixalus sylvaticus, Hyperolius microps), **Daniel Hollands** (Sclerophrys garmani TL, Sclerophrys gutturalis BL, Kassina senegalensis TL, Ptychadena schillukorum TL, Phrynobatrachus kakamikro, Pyxicephalus edulis TL), **Jorn Kohler** (Afrixalus osorioi TL, Hyperolius cinnamomeoventris TL, BL, Hyperolius lateralis TL, TC, TR, Xenopus borealis TR, Phrynobatrachus scheffleri), **Thomas Madsen** (Leptopelis mackayi TR, Poyntonophrynus parkeri, Hyperolius viridiflavus BC, Cacosternum kinangopensis TR, Phrynobatrachus kinangopensis), **Tomas Mazuch** (Hyperolius viridiflavus TC, Ptychadena nilotica TL), **Michele Menegon** (Arthroleptis stenodactylus LH, Schismaderma carens TL, Scolecomorphus vittatus), **John Ndege** (Afrixalus fornasinii BL) **Jean-Luc Perret** (Leptopelis concolor BR, Sclerophrys kerinyagae BL, Afrixalus septentrionalis TR, Hyperolius parkeri TR, Hyperolius pusillus BL, Hyperolius tuberilinguis BL, BR, Cacosternum plimptoni TR, ML, MR, Ptychadena mahnerti, Amnirana galamensis TR, BL), **Martin Pickersgill** (Arthroleptis xenodactyloides,

Sclerophrys regularis TR, BL, Sclerophrys xeros, Poyntonophrynus lughensis TR, Afrixalus fulvovittatus, Hyperolius microps, Hyperolius howelli TR, Hyperolius montanus TL TC, Hyperolius pusillus TC,TR, Hyperolius sheldricki, Hyperolius pantherinus TL, BL, Amietia wittei, Tomopterna wambensis TL, Ptychadena oxyrhynchus TR, Ptychadena porosissima, Phrynobatrachus acridoides BL, BR, Hoplobatrachus occipitalis BL), **Edoardo Razzetti** (Sclerophrys turkanae, Poyntonophrynus lughensis TR, Kassina senegalensis TR, Amietia nutti TL, Tomopterna cryptotis TR), **Dennis Rodder** (Afrixalus fornasinii TR), Mark-Oliver Rödel (Ptychadena mossambica), **Vladimir Trailin** (Hildebrandtia macrotympanum TR, Hildebrandtia ornatum BL, Chiromantis kelleri TL, BL). **Washington Wachira** (Ptychadena mahnerti), **Elvira Wolfer** (Leptopelis bogagii TL), **Breda Zimkus** (Phrynobatrachus bullans), **Andre Zoersel** (Mertensophryne taitana, Hyperolius howelli TL, Ptychadena oxyrhynchus TL, Ptychadena taenioscelis). All other photographs are by the authors.

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Further Reading and resources

On the Internet:

The Kenya Reptile Atlas
www.kenyareptileatlas.com

Facebook forum:
East African Snakes and other reptiles
www.facebook.com/groups/662521540444058

Inaturalist project on the Herpetofauna of the Eastern Afromontane:
www.inaturalist.org/projects/eastern-afromontane-herpetofauna

Books:

Amphibians of East Africa
Alan Channing and Kim Howell.
Chimaira Publishers.
ISBN 3930612534
Excellent book, with details of breeding, calls etc.

A Pocket Guide to the Reptiles and Amphibians of East Africa
Spawls, Howell and Drewes.
Bloomsbury Publishers.
ISBN 9780713674255

A Photographic Guide to the Snakes, Other Reptiles and Amphibians of East Africa
Bill Branch.
Struik Publishers.
ISBN 9781775841654

Field Guide to the Frogs of Africa
Alan Channing Mark-Oliver Rödel.
Struik Nature.
ISBN 9781775845126

Museums and Institutes:

In Kenya contact the Herpetology Section at the National Museum in Nairobi on Museum Hill
Nairobi Tel:
+254-20-8164134/35/36 +254 20 3742131/4

Bio-Ken Snake Farm; Watamu, Kenya
(NB: Bio-Ken will also help in a snakebite emergency: contact emergency phone **254 718 290324**).

A free downloadable copy of this book can be obtained in the downloads page of the Kenya Reptile Atlas:
www.kenyareptileatlas.com



Domnick V Wasonga is a research herpetologist at the Herpetology Section at the National Museums of Kenya. He has conducted extensive fieldwork in East Africa, and is the author of a number of papers on Kenya's amphibians, including the description of several new species of frog. He can be reached by e-mail at dwasonga@museums.or.ke.



Robert C Drewes is Emeritus Curator and Chairman of the Department of Herpetology at the California Academy of Sciences in San Francisco. For 50 years he has led research expeditions throughout Africa and its islands and is the author of numerous scientific publications on the natural history, evolutionary relationships and biogeography of African amphibians and reptiles.



Stephen Spawls went to Kenya when he was four and caught his first chameleon at the age of six. African herpetology is his major interest, he has spent 39 years in Africa and lived and worked in five African countries. His publications include 'Kenya: A Natural History' and 'Field Guide to East African Reptiles'. He lectures in science at City College Norwich. He can be contacted at stevespawls@hotmail.com.