



## Correspondence

### Extreme longevity in an individual of Neotropical frog, *Ctenophryne aterrima* (Anura: Microhylidae)

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It is generally understood that anurans inhabiting cool or temperate regions, whether latitudinally or altitudinally, tend to reach higher ages than those living in warm and hot areas. For example, temperate zone European *Bufo bufo* (LINNAEUS, 1758) have been documented to attain ages of up to 13 years (KUHN 2006), and even 20 years at higher elevations (GROSSENBACHER 2002), *Rana temporaria* LINNAEUS, 1758 reached eleven years in the lowlands and 15 in alpine environments (RYSER 1996), and Andean harlequin toads (*Atelopus carbonerensis* RIVERO, 1974) more than ten years (LA MARCA 1984).

In contrast to these long-lived species, examples of tropical frogs, such as the treefrog *Boana rosenbergi* (BOULENGER, 1898) or poison-dart frogs like *Ameerega trivittata* (SPIX, 1824) do not (KLUGE 1981) or only rarely (NEU et al. 2016) survive to a second reproductive period, i.e. two years of age. Similarly, RAMIREZ et al. (1998) estimated the life expectancy of Mexican *Lithobates vaillanti* (BROCCHI, 1877) at merely eight months. These differences are attributed to various factors including different metabolic rates, reproductive investment, and mortality risks of anurans associated with different temperature regimes (WILLIAMS et al. 2006, XHANG & LU 2012).

In contrast to frogs in the wild, numerous individual frogs living under captive conditions are more long-lived than those recorded in the wild (DUELLMAN & TRUEB 1986, ZIMMERMANN 2000). This increased longevity can be explained by the absence of predation, stable environmental conditions and food supply, as long as the husbandry requirements are adequately met. The longest-lived frogs in captivity include a *Bufo bufo* that reached 36 years (DUELLMAN & TRUEB 1986), an *Anaxyrus americanus* (HOLBROOK, 1836) of 30 years (CAREY & JUDGE 2000), a *Bombina variegata* (LINNAEUS, 1758) at 29 years (GOLLMANN & GOLLMANN 2012), a *Rhinella marina* (LIN-

NAEUS, 1758) at 24 years, 10 months, and 30 days (SNIDER & BOWLER 1992), and a *Litoria caerulea* (WHITE, 1790) at 24 years (KWET et al. 2002).

Although the absolute numbers indicate general patterns of longer lifespans in temperate versus tropical and captive versus wild conditions, there are notable exceptions. For instance, BELL & PLEDGER (2010) recorded a wild *Leiopelma hamiltoni* McCULLOCH, 1919 (as *L. pakeka* BELL, DAUGHERTY & HAY, 1998) with 37+ years on subtropical Maud Island, New Zealand. And skel- etochronological analysis of wild male *Hylarana nigrovittata* (BLYTH, 1856) from tropical Thailand indicated lifespans of up to nine years (KHONSUE et al. 2000). This report presents another such exception: the microhylid frog *Ctenophryne aterrima* (GÜNTHER, 1901) from tropical Panama, which reached an exceptional age in captivity even exceeding anurans from temperate regions, both captive and wild.

An individual (Fig. 1) measuring 56 mm in snout-vent length (SVL) was found by JÖRG SPÖRLE and the author within the forest reserve of Fortuna, Provincia de Chiriquí, western Panama (approximately 8°45'36" N, 82°12'44" W, 1170 m a.s.l.) on 24 July 1987 while it was crossing the road in a very rainy night. It was collected as a voucher specimen, because the species had been known from the neighbouring Costa Rica from the original description (GÜNTHER 1901) and Colombia (DUNN 1944), but to our knowledge it had never been reported from the intermediate Panama before (JUNGFER 1988a). Several years later, the species was also recorded in central Panama (DONNELLY et al. 1990). The frog was a male, as identified by the presence of nuptial rugosities on Fingers I–III. Due to time constraints, it was not preserved and instead transported to Germany alive (Fig. 1a), where it lived in a moist terrarium of 50 × 50 × 50 cm for most

of the time at temperatures ranging from 19°C (night) to 24°C (day) and was fed juvenile house crickets (*Acheta domesticus*) and *Drosophila* fruit flies.

At the time of collection, the frog was already adult, as indicated by the nuptial pads on the fingers. Over the next four years it grew to 59 mm SVL. No further measurements were taken thereafter. No advertisement call was ever heard, but this is no surprise, for no “rainy sea-

son” was ever induced by artificial “rain” that could have simulated a breeding season. SAVAGE (2002) assumes that the species has no advertisement call. However, when grasped lightly in the groin with two fingers, the frog exhibited vigorous toe vibration, which was interpreted as a release signal.

Food was almost exclusively accepted when it was small enough to be ingested entirely by means of the tongue. Hardly any item was held with the jaws. It exhibited a preference for light-coloured prey such as *Acheta* and some *Drosophila*, over dark one (e.g. small black *Gryllus bimaculatus*), probably consistent with a natural diet primarily composed of (white) termites, although one was observed eating ants (SOSA BARTUANO & GUERREL 2014).

In early summer 1994, the frog was placed in an outdoor terrarium, but when nocturnal temperatures dropped to 8°C, the frog was so stiff and hardly able to move, that it was promptly returned indoors. After about ten years, a dorsal skin lesion, 2–3 mm wide, developed but healed within a week after topical antibiotic treatment. In July 2016, after 29 years living in a terrarium, the frog was found to lack the right eye (Fig. 1c). Only an empty eye socket was to be seen. Although with restricted eyesight, it was able to catch prey on its own. By early 2024 the left eye became severely swollen, apparently rendering the frog blind, for it was unable to locate prey. For feeding, it had to be placed in a small plastic box, where it caught prey when it made contact with the frog’s fingers. Nonetheless, it was able to locate its usual hiding places after feeding.

The frog was last observed alive on 24 June 2024, 36 years and 11 months after its capture. Five days later, it was found dead and in an early state of decomposition. Given that the frog had been adult upon collection and, including embryonic and larval stages, been at least one year old, it must at least have been about 38 years of age. During its lifetime, it had been assigned to three different genera (*Glossostoma* GÜNTHER, 1901, *Nelsonophryne* FROST, 1987, *Ctenophryne* MOCQUARD, 1904), which left the frog remarkably unimpressed. It was illustrated twice (JUNGFER 1988a, SAVAGE 2002) and survived the catastrophic chytrid epidemic of the 1990s (LIPS 1999) that left Fortuna, once inhabited by more than 35 species (JUNGFER 1988b, LIPS 1999), depauperate of frogs, especially of the endemic species of the Talamanca herpetofauna, until today (pers. obs. in 2024).

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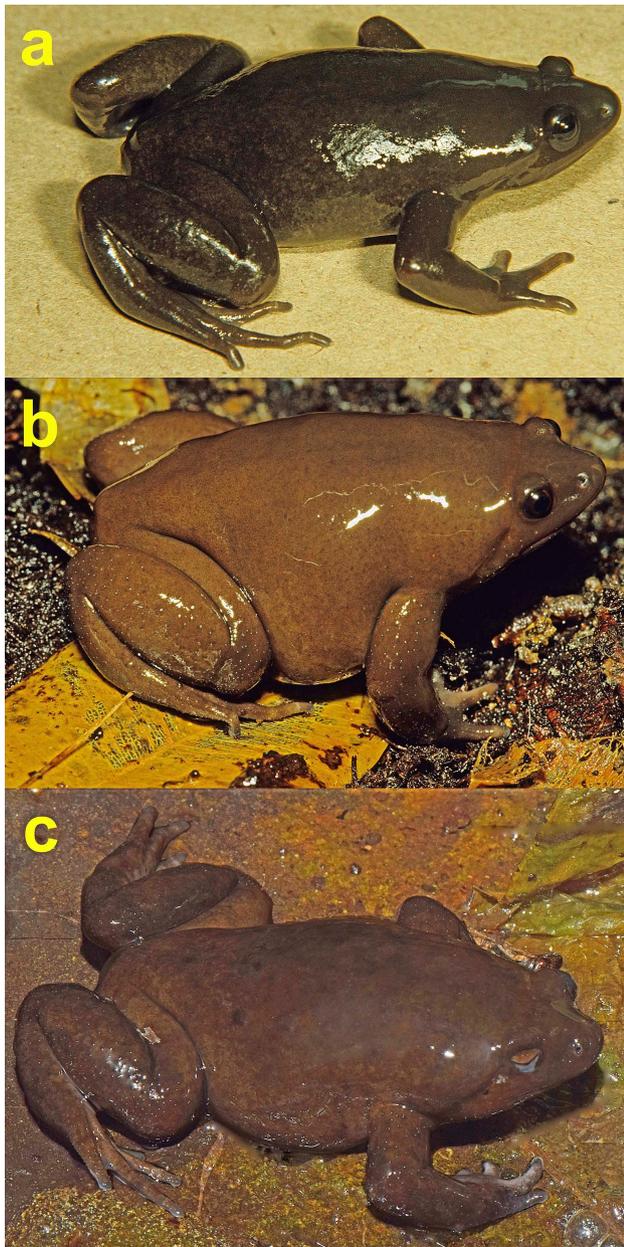


Figure 1. Male *Ctenophryne aterrima* from Fortuna, Panama: (a) 23 days after collection on 16 August 1987; (b) three years later on 8 June 1990; (c) 29 years after collection, after having lost its right eye, on 10 July 2016.

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