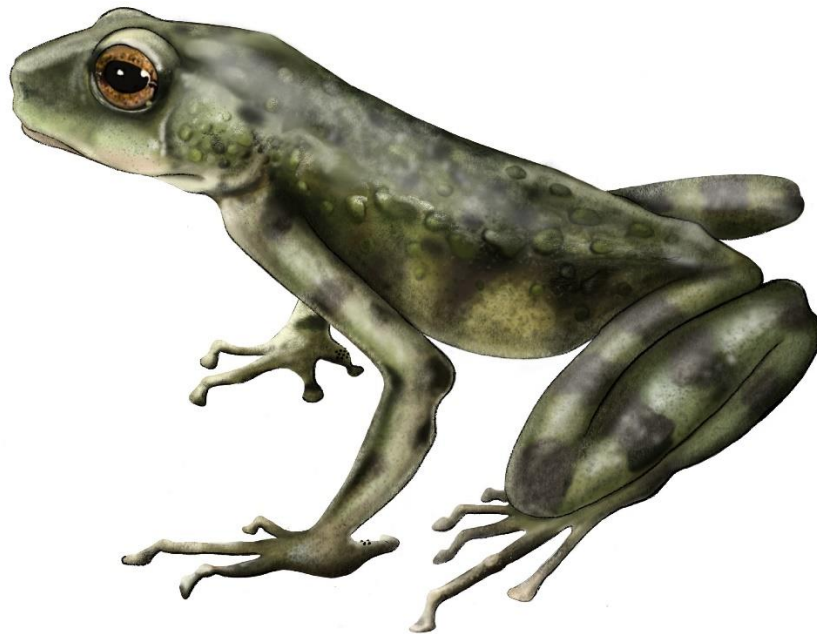


## NOTA DE PRENSA

# New Kenyan volcano toad species reveals hidden evolution of African amphibians

- Toad found living on volcano is new species and genus.
- The new species' presence suggests we may need to rethink the evolution of Kenya's amphibians



*Artistic rendition of *Kenyaphrynoides vulcani**

**Sevilla, 9 November 2023.** A remarkable discovery in the high forests of Mount Kenya has unveiled a new species of toad, known as the Kenyan volcano toad (*Kenyaphrynoides vulcani*). This finding is shedding light on the mysterious evolutionary history of amphibians in East Africa and challenging previous notions about the biogeographical history of the region. The Estación Biológica de Doñana (EBD – CSIC) has participated in the identification of the new species, with the collaboration of members of the Natural History Museum in London and National Museums of Kenya.

“It was incredible to see the first images of this animal! It was immediately clear that it must be a new species because it looks like no other frog”, says Dr. Christoph Liedtke, a researcher at the Estación Biológica de Doñana and first author of the study. “It had clear resemblances to the Tanzanian montane forest toads that we had been studying, which was again a real surprise,

because we did not expect to find a species on a volcanic, relatively young mountain like Mt. Kenya.”

The discovery of the new toad species has puzzled scientists due to its unique appearance and unexpected presence in Kenya. Contrary to the prevailing belief that most of Kenya's amphibian species originated after volcanic activity subsided millions of years ago, the Kenyan volcano toad may date back as far as 20 million years, making it significantly older than the volcanic formation of Mount Kenya itself. With only one male toad found thus far, researchers are eager to discover more individuals to piece together its extraordinary evolutionary story.

Dr. Simon Loader, Principal Curator in charge of Vertebrates at the Natural History Museum, expressed his amazement, saying, ‘Many of Kenya’s mountains are volcanic or geologically comparatively new, so to find an ancient lineage that has persisted for millions of years is mind-blowing. It’s a real conundrum to figure out how it got here.’

‘While we’re not certain, it seems like it might once have had a wider distribution and as the climate changed over the past 10’s of millions of years, it tracked the tropical forest as it moved, with the toad’s final destination being the top of Mount Kenya.’

The discovery of the Kenyan volcano toad challenges the notion of the "Kenyan Interval," a term used to describe the stark contrast in amphibian diversity between Kenya and its neighbouring countries. While Ethiopia and Tanzania have long been biodiversity hotspots for amphibians, Kenya's geological history, and the frequency of tectonic activity, has made it a challenging place for these creatures to thrive. The unique characteristics of *K. vulcani* suggest that the Kenyan Interval may not be as straightforward as previously believed.

## Identifying the new species

When the toad was first discovered in a pitfall on Mount Kenya back in 2015, it already appeared to be very different from the species that are normally found in the region. Drs Patrick Malonza and Victor Wasonga, curators at the National Museums of Kenya, who were co-authors on the paper, were the first to realize that this is something new, ‘We were really surprised to see this animal – it didn’t look like anything we had seen before but resembled something we knew from Tanzania called *Churamiti maridadi*, a forest tree toad from the rainforests of the Ukaguru mountains. When my colleagues in Kenya sent me this picture of an unidentified toad they thought it was unusual and I instantly agreed it was really interesting.’

To confirm if this was a new species, Malonza and Wasonga contacted Liedtke and Loader, who had been studying a special group of frogs that give birth to live young and are found high up on mountains in Tanzania, which this new specimen shared some similarities with. It was necessary to check whether it was indeed a different species and, if so, how it was related to the other species. Its characteristics such as its shape, colour and DNA had to be compared to the other specimens. They revealed that not only was the toad a new species, but in fact an even more distinct branch of the tree of life known as a genus.

The new toad's distinct features include a smaller size, a more frog-like body, and distinctive green and brown markings. Its genetic and morphological differences from other known toad species have led to its recognition at the genus level. Despite being formally described as a new species, much remains unknown about the toad. Clues from its physical characteristics, such as enlarged fingertips suggest it may be a climber. Its thumbs also have sharp points known as nuptial spines which are found in many male frogs and toads, as they help the male grab onto a female and stimulate them into breeding.

Dr Hendrik Müller, curator at the Natural Sciences Collections and expert on developmental biology in amphibians at the Martin-Luther-University Halle-Wittenberg who is also a co-author on the paper said, 'These forest toads found in mountains in East Africa are unusual and don't look like a typical toad. More interestingly, several are known have an unusual breeding strategy called ovo-vivipary. In ovo-viviparity the eggs hatch inside the female. This means that the young emerge from the mother as small toads, rather than as tadpoles.'

The discovery of the Kenyan volcano toad has raised questions about the possible existence of additional undiscovered amphibian lineages in East Africa, emphasizing the need for further research and exploration in the region. So far, only one animal has been found. This means we no next to nothing about its natural and life history, nor do we know about how common it is and whether it needs special conservation attention.

'We don't know everything about the main groups of amphibians, and probably only understand a small proportion of their true diversity,' says Dr Christoph Liedtke, postdoctoral researcher at the Estación Biológica de Doñana, in Seville, Spain, and first author on the paper, 'While this new genus doesn't change our whole view of the Kenyan Interval, it suggests that the reality is much more complex than has been suggested. We can't presume on geology alone that other amphibian lineages don't exist. "e are still adding major branches to the amphibian tree of life and that many places, especially on the African continent, are likely to hold yet to be catalogued biodiversity."

#### **Reference:**

H Christoph Liedtke, Patrick K Malonza, Domnick V Wasonga, Hendrik Müller, Simon P Loader, A new genus and species of toad from Mount Kenya illuminates East African montane biogeography, *Zoological Journal of the Linnean Society*, 2023;, zlad160, <https://doi.org/10.1093/zoolinnean/zlad160>

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