

# New species of cobra-like snake discovered, but it may already be extinct

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*Hemachatus nyangensis* in Nyanga National Park, Zimbabwe. Credit: Donald Broadley, Author provided

Around the world, natural history museums hold a treasure trove of knowledge about Earth's animals. But much of the precious information is sealed off to genetic scientists because [formalin](#), the chemical often used to preserve specimens, [damages DNA](#) and makes sequences hard to recover.

However, recent [advances in DNA extraction techniques](#) mean that biologists can study the genetic code of old museum specimens, which include extremely rare or even recently [extinct species](#). We [harnessed this new technology](#) to study a snake from the Eastern Highlands of Zimbabwe that was run over in 1982, and discovered it was a new [species](#). Our research was recently published in *PLOS One*.

The [Eastern Highlands of Zimbabwe](#), a mountain chain on the border with Mozambique, [create a haven](#) of cool and wet habitats surrounded by savannas and dry forest. They are home to many species that are [found nowhere else](#).

Here, a mysterious population of snakes first drew the attention of scientists around 1920. An unusual snake displaying a cobra-like defensive hooding posture was spotted in the grounds of [Cecil Rhodes'](#) (prime minister of the Cape Colony in the late 19th century) Inyanga Estate in Nyanga.

This snake had unusual markings with red skin between its scales, creating the effect of black dots on a red background when its hood is extended. None of the other cobras found in the area match this description.

More snakes like this were reported in the 1950s, but no specimens were collected.

## **A rare find**

The mystery surrounding these sightings piqued the interest of the late [Donald G. Broadley](#), now considered to be the most eminent herpetologist ([reptile and amphibian expert](#)) of southern Africa. In 1961, Broadley was given some severed snake heads and identified the mystery snake as a [rinkhals \(\*Hemachatus haemachatus\*\)](#), a species otherwise only found in South Africa, Eswatini (formerly known as Swaziland) and Lesotho.

A handful of specimens were observed and measured in later years, but the landscape has been drastically altered by forestry. The rinkhals from Zimbabwe has not been seen in the wild since 1988 and is feared to be extinct.

This population lives 700km away from other, more southerly populations, which made us suspect it may be a separate species. But the [genetic material](#) contained within the specimen from Zimbabwe was degraded, meaning we couldn't do the DNA studies needed to confirm whether it is a different species from other rinkhals.

## **New technology**

However, the latest DNA extraction and sequencing methods have been developed over the last ten years to help biologists study the [remains of ancient animals](#). We used the new techniques to examine the Zimbabwe rinkhals specimen. Our study showed they represent a long-isolated population, highly distinct from the southern rinkhals populations.

Based on their genetic divergence from the other rinkhals, we estimate that the snakes in Zimbabwe diverged from their southern relatives 7–14 million years ago. Counting a [snake's](#) scales can help identify what species it is. Subtle differences in scale counts, revealed by our analysis of other specimens, provided enough evidence to classify the Zimbabwe rinkhals as a new species, *Hemachatus nyangensis*, the Nyanga rinkhals.

The scientific name *nyangensis* means "from Nyanga" in Latin.

*Hemachatus nyangensis* has fangs modified to spit venom, although the behavior was not reported from the few recorded interactions with humans. The closely related true cobras ([genus \*Naja\*](#)), some of which are known to spit venom, do so with the same specialized fangs that allow venom to be forced forwards through narrow slits, spraying it toward animals that are threatening them.

Venom in the eyes causes severe pain, may damage the eye, and can cause blindness if left untreated. [Venom spitting](#) appears to have [evolved three times](#) within the broader group of cobra-like snakes, once in the rinkhals, and twice in the [true cobras](#) in south-east Asia and in Africa.

## **A connection between human and snake evolution**

Scientists think this defense mechanism may have evolved in response to the first hominins (our ancestors). Tool-using apes who walked upright would have posed a serious threat to the snakes, and the evolution of spitting in African cobras roughly coincides with when hominins split from chimpanzees and bonobos 7 million years ago.

Similarly, the venom spitting in Asian cobras is thought to have emerged around [2.5 million years](#) ago, which is around the time the [extinct human species \*Homo erectus\*](#) would have become a threat to those species. Our study of Nyanga rinkhals suggests that the third time venom spitting evolved independently in snakes may also have coincided with the origin of upright-walking hominins.

If a living population of Nyanga rinkhals was found, fresh DNA samples would help us to more accurately determine the timing of the split between the two species of rinkhals and how this compares to hominin evolution. Technological advances may be giving us incredible insights

into ancient animal lineages but they can't make up for an extinction. We still hope a living population of Nyanga rinkhals will be found.

The possible relationship between venom spitting and our early ancestors is a reminder that we are part of the Earth's ecosystem. Our own evolution is intertwined with that of other animals. When animals become extinct, we don't just lose a species—they take part of our history with them.

**More information:** Tom Major et al, Museum DNA reveals a new, potentially extinct species of rinkhals (Serpentes: Elapidae: Hemachatus) from the Eastern Highlands of Zimbabwe, *PLOS ONE* (2023). [DOI: 10.1371/journal.pone.0291432](https://doi.org/10.1371/journal.pone.0291432)

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