

South African animals at risk of extinction

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Photograph: David Brossard



Photograph: David Clode

Black rhinoceros

Black rhinoceros (*Diceros bicornis*) are listed as **Critically Endangered** on the IUCN Red List of Threatened Species. The species has experienced a 96% reduction in numbers between 1970 and 1992. The greatest threats to the species include poaching and habitat loss.

Not all glitter and rainbows for black rhinoceros

Isa-Rita Russo¹, Stefan Prost^{2,3,4,5}, Desiree Lee Dalton^{2,6} and Kim Labuschagne²

Rhinoceroses are large, herbivorous mammals. The word rhinoceros comes from the Greek *rhino* (nose) and *ceros* (horn). Prehistorically, nearly 100 known rhinoceros species existed and were once abundant throughout Europe, Asia and Africa. Today, five species of rhinoceros survive as small populations in Asia and Africa and are all threatened with extinction. The family Rhinocerotidae consists of white rhinoceros (*Ceratotherium simum*), black rhinoceros (*Diceros bicornis*), Sumatran rhinoceros (*Dicerorhinus sumatrensis*), the Indian and Javan rhinoceros (*Rhinoceros unicornis* and *R. sondaicus*, respectively). These species vary with regards to their number of horns. The black, white and Sumatran rhinoceros have two horns, while the Javan and Indian rhinoceros have one horn. Their current distributional range is significantly smaller than it was in the past and is highly fragmented.

Evolutionary history

In 2021, researchers started to piece together the puzzle of the evolutionary history of rhinoceros by analysing the genomes of the five living species of rhinoceros (black, white, Sumatran, Indian or greater one-horned and Javan rhinoceros) and three extinct rhinoceros species (woolly rhinoceros [*Coelodonta antiquitatis*], Siberian unicorn [*Elasmotherium sibiricum*] and Merck's rhinoceros [*Stephanorhinus kirchbergensis*]). The historical distribution range of the five extant species and three extinct species is shown in Figure 2. The genome is the entire DNA of an organism and can provide researchers with information about their evolutionary history. The authors found that rhinoceros from the same geographic regions were more closely related than species that share characteristics, like the number

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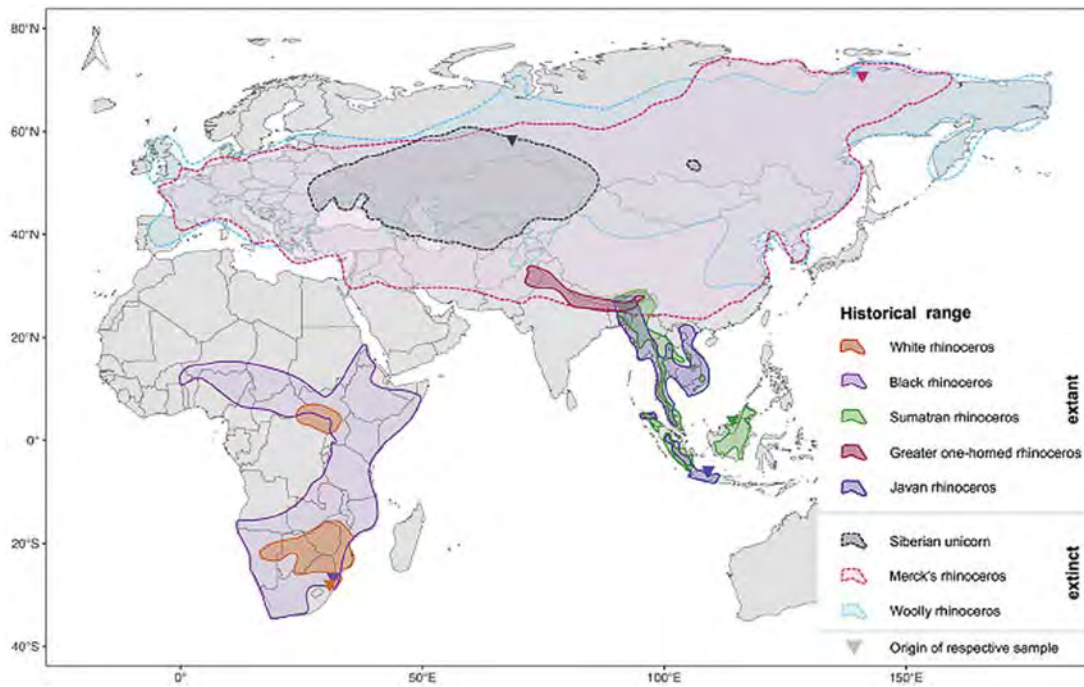


Figure 2: Distribution map of rhinos.

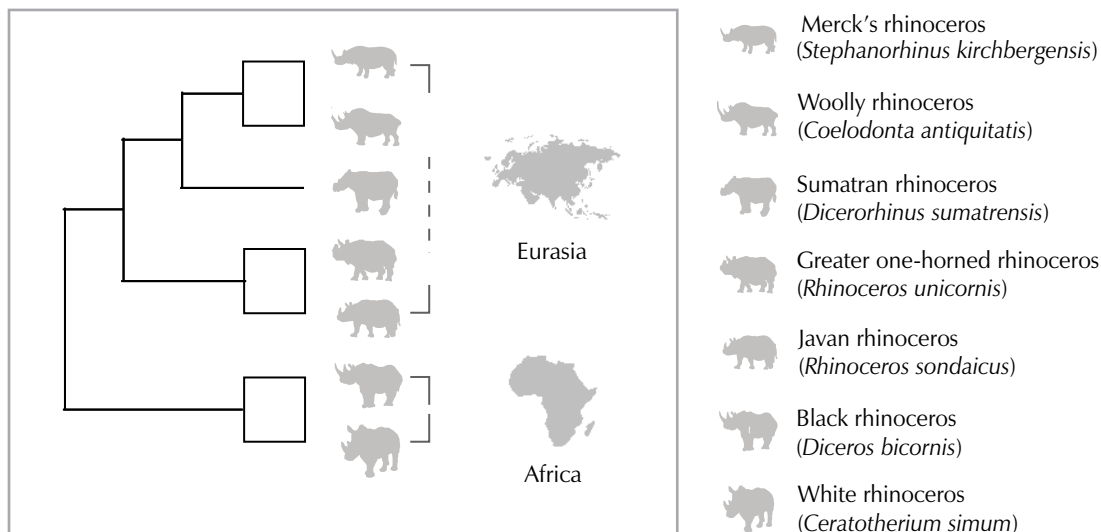


Figure 3: The evolutionary history of rhinos.

of horns. Approximately 16 million years ago, rhinoceros were divided into two groups (African and Asian) and the ancestors of living black and white rhinoceros moved down into the African continent. The Asian group located in Eurasia (the continent comprising Europe and Asia) was further split into two groups approximately 14.8 million years ago. One group consisted of the greater one-horned and Javan rhinoceros, which are found in Sumatra, and the second group includes the Sumatran, Merck's and woolly rhinoceroses (Figure 3).

Dwindling numbers

The black rhinoceros (*Diceros bicornis*) was once distributed in large numbers across most of sub-Saharan Africa, however, in the 20th century, populations were reduced both in number of animals and range due to human pressure and poaching. In the mid-1990s, populations were down to approximately 2 400 animals, however, there are now about 5 000 animals due to a slow recovery. Currently, there are only five African countries that still maintain indigenous black rhinoceros' populations. The number of black rhinoceros subspecies has been debated for decades. In 1987 it was suggested that black rhinoceros can be divided into four subspecies namely, western (*D. b. longipes*), eastern (*D. b. michaeli*), south-central (*D. b. minor*) and south-western (*D. b. bicornis*). This classification was adopted by the International Union for Conservation of Nature's (IUCN) African Rhino Specialist Group and is the prevailing basis for conservation management of this species. Researchers use DNA to infer whether populations carry enough genetic diversity or suffer from inbreeding (which occurs if individuals in a population are closely related). The genetic diversity can also be used to estimate the chance of a population to survive future environmental change or infectious disease outbreaks. In 2017, researchers used DNA extracted from tissue and faecal samples from wild black rhinoceros and compared the results to those obtained from skin samples from museum specimens. The results showed that the black rhinoceros lost 69% of the species' mitochondrial genetic variation over the last decades, which means that the species may not be able to adapt in the future as the climate changes and landscapes are altered due to humans. However, low genetic



Photograph: Ray in Manila

What is the difference between a black and a white rhinoceros?

Although they may be black and white in name, African rhinoceros are the same colour (grey), however, there are several differences between the species. White rhinoceros are bigger than black rhinoceros and white rhino calves tend to run in front of their mothers, while black rhino calves tend to run behind their mothers, especially during flight. The black rhinoceros has rounded ears, a round head, less of a pronounced hump on the back of their necks and a pointed lip, which helps them feed on leaves from bushes and trees. White rhinoceros have pointed ears, an elongated head and are known for their square lip used for grazing.

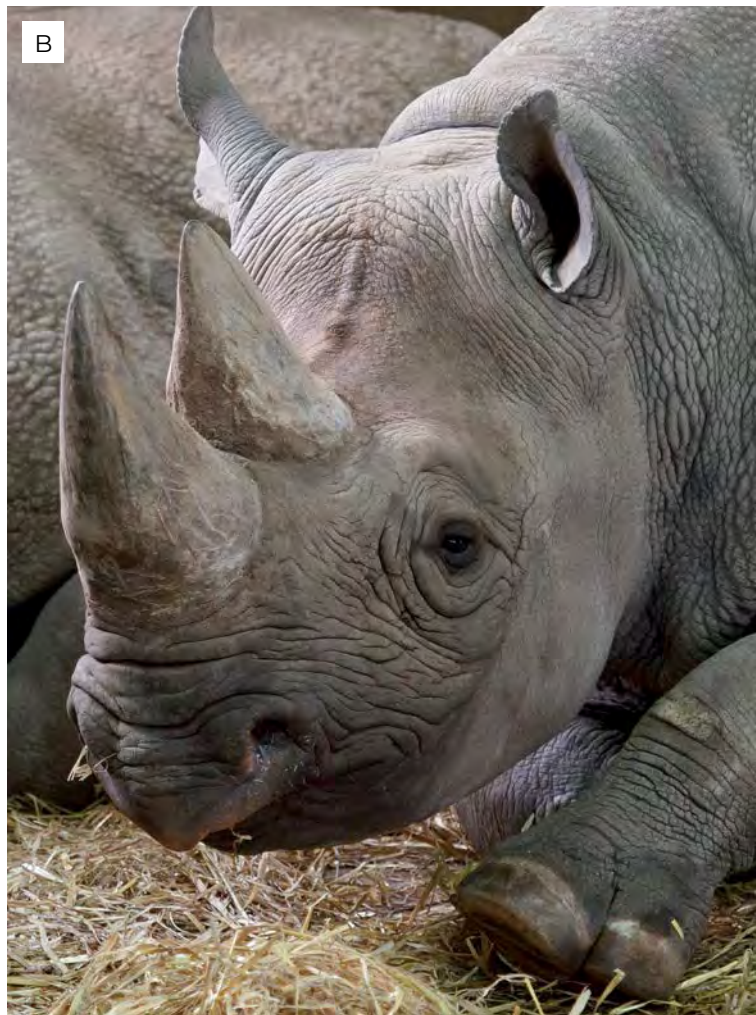


Figure 4: A, a white rhinoceros and B, a black rhinoceros. Photographs, A, David Clode; B, Public Domain Pictures.

diversity appears to be a long-term feature of rhinoceroses, thus, the likelihood of focused conservation efforts may be more fruitful than previously envisioned.

Ecology and biology

A black rhinoceros generally weighs between 700 and 1 300 kg, with males and females being the same size. The species is found in a variety of habitats, including open plains, sparse thorn scrub, savannas, thickets and dry forests, as well as mountain forests and moorlands at high altitudes. It is a selective browser where grass plays a minor role in its diet. They feed on a variety of plant species and preferences vary between habitats and seasons. However, they avoid plants that contain volatile chemical compounds, such as phenols and alkaloids. Rhinoceros play an important role in the ecosystem by shaping the land around them over time. For example, they wallow in mud puddles that lead to the creation of natural waterholes and can keep existing water holes open for other animals. They also spread nutrients throughout their home range that fertilises the soil and provides livelihoods for many other species as they consume more than 50 kg of vegetation per day and deposit more than 20 kg of dung. Black rhinoceros require drinking water every 24–48 hours and will select home ranges that include one or more permanent water sources. Home range sizes for black rhinoceros are reported to be highly variable (3–218 km²) and varies between seasons. Most black rhinoceros are solitary but have social dynamics and interactions that are complex. They exhibit a polygynous mating system and males are territorial at approximately eight to ten years of age when they will compete for social standing and females for breeding. Territories of males overlap with adult females and females share a portion of their home ranges with adult female offspring. Female black rhinoceros often have longer and thinner horns while males tend to have thicker horns. Black rhinoceros are pregnant for 15 months and breed from about seven years of age. Mothers will care for the calves for two years, protecting them from hyenas and lions. A rhinoceros' lifespan is typically 40 to 45 years in captivity and may be less in the wild.

Killed for their horns

Rhinoceros face several threats, including habitat loss and fragmentation and the targeted illegal killing of rhinoceros (poaching) for their horns. Rhinoceros horn is a sought-after commodity, have been valued for centuries as a carving material and for medicinal purposes and can fetch high prices. The horn is mainly made up of a single protein known as keratin that is also



Photograph: Hans Veth

found in hair (including human hair), fingernails and animal hooves, thus when carved and polished the object made from horn takes on a translucent appearance. As ornamental objects, rhinoceros' horns have been used to make handles for daggers, walking sticks and door handles to pistol grips and limousine interiors. Horns are also used as a traditional medicine in Asian countries such as Malaysia, Korea, Vietnam, India and China. It is thought to treat fever, rheumatism, gout and cancer and is seen as a status symbol among the wealthy. Other uses in traditional medicine included treating snakebite, boils and food poisoning, as well as curing headaches, hallucinations, high blood pressure and typhoid fever.

Black rhinoceros use their horns as weapons during confrontations and for protection. They may also be used during encounters with other rhinoceros to demonstrate dominance or make a threat display. Several conservation groups and local governments are working to protect this endangered species. African countries have started efforts to protect their rhinoceros such as expanding existing protected areas, security

monitoring to protect rhinoceros from poaching and improving law enforcement to curb illegal wildlife trade from Africa. In South Africa, translocation of black rhinoceros has resulted in populations increasing on private land and in protected areas. However, these populations may be small and isolated and thus require human intervention as part of a metapopulation management programme (managing several discrete populations collectively as one herd) to ensure that the species has sufficient diversity to cope with future environmental change. In addition, China no longer approves of the use of rhino horn for traditional medicines and countries in the Middle East promote dagger handles made of synthetic materials. To help this species, you can support organisations that assist wildlife rangers who dedicate their lives to protecting the world's endangered rhinoceros. You can also donate to reputable organisations that work with rhinoceros sanctuaries across Africa, don't buy rhinoceros products, report illegal wildlife trade anonymously using the Wildlife Witness app, and you can adopt a rhino through the World Wildlife Fund or the International Rhino Foundation.



Photograph: William Phipps

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