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To help beleaguered Javan rhinos, study calls for tree felling, captive breeding

by **Jeremy Hance** on 27 December 2023

- *The sole remaining population of Javan rhinos, around 70 individuals, persists in a single national park in Indonesia.*
- *A new paper argues that conservationists should clear some areas of the park to increase feeding areas for rhinos, and create a captive-breeding program for the species.*
- *Recent government reports indicate that 13 of the remaining Javan rhinos display congenital defects, likely due to inbreeding.*
- *Despite intensive monitoring by camera trap, scientists know relatively little about the species' reproductive behavior and breeding patterns.*

Once roaming across Southeast Asia, the Javan rhino today persists on a single peninsula off the western-most coast of Java in Indonesian. There, in Ujung Kulon National Park, around 70 Javan rhinos (*Rhinoceros sondaicus*) survive. A [tsunami](#), a [disease](#) or a determined group of poachers could [wipe them out](#) for good. To complicate matters further, a [report](#) this year by local NGO Auriga Nusantara alleged that rhinos in the park were being [mismanaged](#), raising numerous concerns — including of dead rhinos officially being counted as alive.

Now, a new [paper](#) in the journal *Gazella* argues that conservationists should begin felling large trees in the park to create more feeding areas for rhinos, and start a captive-breeding population due to rising concerns over potential inbreeding.

“Genetic studies conducted on the Javan rhinoceros have indicated low genetic diversity within the population,” says study co-author Francesco Nardelli, with the Asian Rhino Specialist Group at the IUCN, the global wildlife conservation authority. “Low genetic diversity is often associated with inbreeding depression, which can lead to reduced fitness and increased susceptibility to diseases.”

Indeed, a government management program for the critically endangered Javan rhino, which lays out plans for 2023-2029, mentions 13 Javan rhinos displaying “congenital defects” likely due to breeding within such a small group for decades.

Another concern is that the population is lopsided in terms of sex. The population has significantly fewer adult females than males. Nardelli says there may only be a “dozen” breeding females left. And although they continue to produce calves, it may not be happening quickly enough to raise the population’s numbers or even keep it afloat.



Cut some trees?

The best way to counter genetic issues is to produce a bigger population, according to the paper’s other co-author, Jan Robovský, a biologist at the University of Southern Bohemia in Czechia. But the current population seems to have plateaued at around 70 animals, and many fear that the current habitat is incapable of supporting more animals. Robovský compares the Javan rhino to the other living rhino species from the same genus: the greater one-horned rhino (*Rhinoceros unicornis*), also known as the Indian rhino. While the greater

one-horned rhino recovered quickly once poaching was curtailed, the Javan rhino population hasn't taken off. Whether this is due to ongoing poaching in the park or a lack of space and food remains an open question.

To help address the potential issue of food supply, Nardelli and Robovský suggest cutting down some large trees inside Ujung Kulon National Park to create new clearings for rhinos to feed.

"Javan rhinoceroses are primarily browsers, and their diet consists mainly of leaves," Nardelli says. "By creating clearings, there is an effort to stimulate the growth of saplings, providing a more abundant and accessible food source for the rhinos. This is particularly important in the context of limited suitable habitats within the park."

Park managers have already spent years working to clear away a fast-growing palm in the protected area, the arenga palm (*Arenga obtusifolia*), to make more room for the rhinos' preferred plant species to grow. However, Nardelli and Robovský argue that tree clearing should go ahead in areas where the palm hasn't taken over.

The government's 2023-2029 rhino management plan mentions creating a "new management design to optimize the carrying capacity of the Javan Rhino habitat," but doesn't go into any further detail.

Nina Fascione, the head of the International Rhino Foundation (IRF), which works with the Indonesia government on rhino conservation in Ujung Kulon, says that "additional habitat management ... would be helpful," but calls for more specific details on what the researchers are proposing.

Robovský further suggests park managers may want to consider moving some banteng (*Bos javanicus*), a wild cattle species, out of the park, since they may compete with the Javan rhino for food. Banteng are listed as endangered on the IUCN Red List.

Still, Fascione says that right now, "the biggest priority for the wild [rhino] population is protection — we know they're naturally breeding so keeping those animals safe is, in our opinion, the most important conservation measure." She adds that inbreeding issues are not the top concern, at least, in the short term.



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Captive breeding

Nardelli and Robovský also suggest setting up a captive-breeding center for the Javan rhino, similar to the one for Sumatran rhinos (*Dicerorhinus sumatrensis*) that has successfully .

The prospect of captive breeding is on the agenda, according to the government's management plan, but experts say they don't expect it to happen anytime soon.

"Captive breeding may well prove to be an essential tool in the arsenal of conservation actions for Javan rhinos," Fascione says, adding that "in fact, a conservation breeding program where genetics can be carefully managed and the population increased rapidly may be one of the best solutions."

The Indonesia government is in the midst of building a new complex inside the park known as the Javan Rhino Study and Conservation Area (JRSCA). Once this is finished, the government plan says it will consider "translocation of selected individuals."

Nardelli says bringing some rhinos into a semiwild captive-breeding program could also lead to scientific understanding that could improve the species' survival.

"Captive breeding programs offer unique opportunities for scientific research and observation," he says. "In a controlled environment, researchers can closely monitor reproductive behaviors, study reproductive physiology, and gather valuable data that can inform conservation efforts both in captivity and in the wild, data which are presently lacking."

Although the Sumatran rhino is probably more threatened than the Javan, given its population is likely less than 50, we know more about the Sumatran rhino because scientists have had decades to study them in captivity. There hasn't been a Javan rhino in captivity in more than a century. Nardelli says the Javan rhino "could be characterized as the least-known rhino species scientifically."

For example, his paper reports that a dead specimen of a Javan rhino in Italy had long been mistaken as that of a greater one-horned rhino, a misidentification the authors believe is common and should lead to a reevaluation of all specimens in the world's museums and collections.

"Detailed knowledge of Javan rhino reproductive behavior, breeding patterns, and the factors influencing their reproduction is still lacking," Nardelli says. "This information is vital for developing effective conservation strategies and can only be assessed through an ex-situ [captive] breeding program."

For decades, conservationists have also pushed for a second Javan rhino site to be established in the wild in Indonesia to expand the population beyond a single site. It could be in Java or Sumatra. Despite this, the Indonesian government has yet to select a site. Their current plan notes the need for "other areas" outside of Ujung Kulon and calls for a "habitat suitability assessment." Yet the search has been "[put on pending](#)" since 2019, according to a senior government official, with no sign to date of it being revived.

Banner image: The newly spotted female Javan rhino calf with its mother. Image courtesy of the Indonesian Ministry of Environment and Forestry.