A new study has identified why so many endangered k?k?p? eggs fail to hatch, and suggests artificial insemination could help save the species.

Researchers from the University of Sheffield and the New Zealand Department of Conservation's K?k?p? Recovery Team have found that the high rate of hatching failure in the critically endangered k?k?p? is not primarily driven by male infertility, as previously assumed, but by a high rate of early embryo death across the population.

The K?k?p? Recovery Team has also trialed artificial insemination and successfully produced chicks, demonstrating its potential as a conservation intervention for the species.

Dr Nicola Hemmings, from the University of Sheffield's School of Biosciences, said: "The k?k?p? is one of the world's most critically endangered birds with only 201 individuals left, which are managed on predator free islands off the coast of New Zealand.

"The population was at its lowest in 1995 when there were only 51 individuals left. Unfortunately this rapid decline meant a lot of the genetic diversity of the population was lost and inbreeding became a problem.

"In the last four decades, over 60 per cent of k?k?p? eggs have failed, which has been a major barrier to the recovery of the species. We found that this is primarily due to a high rate of early embryo deaths, which may be caused by the lack of genetic diversity in the K?k?p? population."

K?k?p? females who have mated multiple times hatch more eggs than those that only mate once, so the recovery team has used artificial insemination to replicate a second mating and boost hatching rates. The present research confirms that artificial insemination increases the number of sperm that reach the egg.

Artificial insemination can also help to reduce inbreeding, which may cause early embryo deaths. Furthermore, the team can minimize the loss of genetic diversity by selecting males with rare genes or selecting pairs of birds that are more likely to be genetically compatible.

The k?k?p? population decline started when Polynesian settlers arrived in New Zealand around 750 years ago and was then accelerated by European colonists in the 1800s who further cleared habitats and introduced more predators to the islands.

Dr Jodie Crane, from the K?k?p? Recovery Team, emphasizes the importance of this work: "K?k?p? are an iconic species across Aotearoa New Zealand, and a taonga (treasured) species for Ng?i Tahu. Since our conservation program began, hatching failure has been a major barrier to recovery. Our management has been successful in increasing the k?k?p? population, but collaborations on studies like these are crucial for solving the challenging conservation problems ahead."

The research was published in Animal Conservation.

More information: J. L. Savage et al, Low
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