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### Unique Collaboration between Trent and Peterborough Zoo Solves Genetic Puzzle

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#### *Rare Red-billed hornbills hatch in captivity with help from Trent's DNA lab*



For fans of the Lion King, the Red-billed Hornbill (aka Zazu in the film) may not be a much of a mystery.

But for researchers at Trent University and the Riverview Park and Zoo these rare birds represented a genetic enigma – a fowl conundrum if you will.

When a trio of hornbills arrived at the zoo they had lost their identifying bands, leaving the research team to wonder: what and who are they?

Trent graduate Mubrouka Elharram began work on her M.Sc. in the DNA lab at Trent with Dr. Bradley White, and said this was one puzzle she was pleased to help solve.

"Since these birds are so high strung their leg bands were lost at some point, and so they could not identify the birds – which is why they came to us," said Ms. Elharram.

Dr. White, director of the [Wildlife DNA Forensic Laboratory](#) at Trent, said he too was delighted to have the chance to work with this threatened species. (The Red-billed Hornbill is now categorized as a species of "least concern" on the official [Red List of Threatened Species](#).)

"This is the first successful hatch in Canada. We have had three live births in total," said Dr. White. Indeed, this is the first time this species has been bred in an accredited zoo in Canada.

Ms. Elharram said researchers would usually know the mother or father at the outset, however, with this particular scenario the Zoo did not know which birds were mother, father or offspring due to the missing leg bands. "We had to use microsatellite profiling and mitochondrial DNA to solve this puzzle. Based on the microsatellite profiles, we were able to determine which hornbills could be excluded as offspring, based on

the alleles they possessed. To further look at matrilineal relationships we developed DNA primers...and determined that one of the males had a different matriline than the other birds, confirming that it was the father," she explained. The project took about four months.

"We are lucky to have such a great lab at Trent with advanced, state-of-the-art equipment, and an automation facility that allows work in the field of genomics," said Ms. Elharram, who grew up in Peterborough and recently moved back to work with Dr. White in the DNA lab.

Steve Thexton, supervisor at the Riverview Park and Zoo, said, "Part of our mandate is to provide research opportunities for Trent students." He added that another goal of the Zoo is to continue breeding programs so that species' can have a self-sustainable population for the next 100-150 years.

"Over the years we have had many birds here paired up with no breeding success. Last year these birds started showing courtship behavior in January and the male mudded the female into the nest box. We determined that there were three eggs in the nest box and on March 2, we discovered three chicks in the nest box with the female," he said, adding: "This is the only zoo in Canada to possess and be breeding the critically endangered Sulawesi forest turtle. There are less than 100 in wild.

"The Peterborough zoo is a special place."

Next steps? Mr. Thexton said the young female bird is going to Denver Zoo to be paired up with a male. The breeding pair will likely stay here and, hopefully, continue to breed. Dr. White said that the DNA lab at Trent is proposing another joint collaboration with the Zoo in the new year.

*Posted on Thursday, November 2, 2017.*

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