

The northern quoll: An amazingly versatile survivor?

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Credit: Nellie Pease

The northern quoll, one of Australia's most adorable and endangered native carnivores, appears to be adapted to dramatically different landscapes—which may be key to the species' survival.

University of Queensland Ph.D. candidate Pietro Viacava co-lead a study that found similarities between northern quoll skulls across a 5000 kilometer range, which has raised hopes scientists will be able to cross-breed isolated populations.

"Northern quolls are in danger—a lot has been thrown at them," Mr Viacava said.

"They've been victims of a devastating cane toad invasion, increases in bushfires and [habitat fragmentation](#), all while facing stiff competition from other carnivores such as dingoes and cats. The problem we are facing with conserving the northern quoll is that there may be too little genetic diversity in these handful of remaining populations, scattered across Australia. If we cross-bred them, we might run the risk that they wouldn't be ideally suited to these diverse environments. Their skulls, for example, might not be properly adapted to eat local prey, as it differs across Australia. Luckily, this doesn't seem to be the case—these quolls seem to be incredibly versatile."

The research team used a technique known as "geometric morphometrics" to characterize [skull](#) shape variation in museum specimens of northern quolls.

They looked for shape differences between populations, or whether [environmental conditions](#) coincided with changes in skull shape.

Dr. Vera Weisbecker from the Flinders University College of Science and Engineering supervised the study, and said the results appeared to be a win for northern quoll conservation.

"Quoll skull shapes were mostly similar across their entire range, although the shapes did vary with the size of the animals," Dr. Weisbecker said.

"This means, for example, that a quoll skull from Pilbara region in WA looked nearly the same as a similar-sized one from south-eastern Queensland, 5000 kilometers apart. Although other parts of the animal's body and genetic factors need to be considered, we will most likely be able to breed animals from different populations for conservation without losing adaptations to feeding."

However, there is also a much less positive potential explanation for the results.

"Scientists have long suspected that marsupial mammals—such as quolls, kangaroos and koalas—are seriously limited in the degree to which they can adapt their skull and skeleton," Dr. Weisbecker said.

"This is because newborn marsupials require a specifically shaped snout to be able to latch onto the mother's teat. In that case, what we see may actually be a serious limitation on the ability of quolls to adapt, rather than the much more hopeful multipurpose solution we propose."

To further explore this possibility, the team is now looking at how closely related species of antechinus—smaller [quoll](#) relatives—differ in skull shape.

The research is published in *Ecology and Evolution*.

More information: Pietro Viacava et al. Skull shape of a widely distributed, endangered marsupial reveals little evidence of local adaptation between fragmented populations, *Ecology and Evolution* (2020). [DOI: 10.1002/ece3.6593](https://doi.org/10.1002/ece3.6593)

Provided by University of Queensland

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