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Save our ringtails

A Daintree River ringtail possum. (Used with permission: Mike Trenerry)

At the highest peaks of Far North Queensland, an elusive nocturnal species of animals could prove to be a bellwether for climate change and its effect on biodiversity in the region.

James Cook University Biologist, Andrew Krockenberger, has co-authored a study on rainforest ringtail possums in the Far North.

The research which has been submitted to the *Journal of Animal Ecology*, says that spikes in temperature during the late dry season are exposing the species to weather higher than the 'thermal specialists' can handle.

"The rainforest ringtail possums are a really important element of the biodiversity [in our region]," Andrew says.

"They're a remnant of a very diverse group that [there] was probably, maybe five times more of twenty million years ago. As Australia has dried out and the rainforest has contracted we've lost most of that diversity.

"What we've been trying to understand is what limits distribution of animals.

"To understand that ... we can start to make predictions about what will happen in the future, if we really know what is controlling current distributions."

A number of studies have previously offered other hypotheses as to why ringtail possums live in high altitude rainforest in Far North Queensland but Andrew says 'the interaction between temperature and moisture' appears to be most likely.

Once temperature spikes occur though it is very difficult for ringtailed possums to cool down.

"These animals are restricted in the amount of food and water they can take in by the chemicals that are in the leaves," Andrew says.

Trees that ringtailed possums live in, such as candlenut trees, don't help either.

"The leaves of those trees are defended by all sorts of plant toxins, including things like cianide," Andrew says. "So if an

animal then uses a lot of water to pant and keep itself cool during heatwaves, then it has a problem getting it back because it has to take in more of those toxins.

"So the idea that we're putting forward is that it's the combination of heat wave events and the time they spend at critical temperatures ... coupled with the amount of water in the leaves and the plant toxins is what might limit their distribution."

Animals that are sensitive to temperature are not uncommon in Far North Queensland's tropical climate.

"The rainforests in Far North Queensland were not always in the same places over the past two million years as they are now," Andrew says.

"In the last glacial maximum, between 15,000 and 20,000 years ago ... a lot of the rainforest that these animals are currently living in, really retracted to small refuges at the tops of hills where it was the wettest.

"What that means is they've been through a filter that selected the cool, wet forest animals. As you warm up out of that glacial maximum, then the rainforest starts to expand and the animals start to come down the hill a little bit."

The study is currently being reviewed by the *Journal of Animal Ecology*. If published, Andrew says his work will have greater repercussions on similar research in the future.

"The value they have on biodiversity is phenomenal," he says. "They're four out of the six species of ringtail possums that you have in Australia. We could potentially lose two-thirds of the diversity of that particular group of animals if those animals disappeared.

"Because they're restricted to rainforests, they're a good barometer of what might be happening in terms of environmental change in the future. So they really give us a pretty serious wake up call."

The endemic species to Far North Queensland are the lemuroid ringtail possum, Herbert River ringtail possum, green ringtail possum and the Daintree River ringtail Possum.

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