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New research finds Tasmanian devils have survived for thousands of years with low diversity

New research has found that Tasmanian devils have survived two major population declines in the last 50,000 years. These results suggest climate change, and not modern human activities, has been responsible for the low genetic diversity seen in devil populations today.

The article, published today in the journal Biology Letters, *Extensive population decline in the Tasmanian devil predates European settlement and Devil Facial Tumour Disease*, was produced by researchers Anna Brüniche-Olsen, Dr Menna Jones, Dr Chris Burridge and Dr Barbara Holland from the University of Tasmania and Associate Professor Jeremy Austin from the University of Adelaide.

Using the largest genetic dataset compiled for devils so far, the research team could rule out extensive bounty hunting following European settlement of Tasmania and Devil Facial Tumour Disease (DFTD, the transmissible cancer responsible for an 80 per cent decline in devils since it was discovered in 1996) as the cause of observed low genetic diversity in the species today.

Instead, environmental changes prior to or during the last glaciation (around 20,000 years ago) and increased El Niño–Southern Oscillation around 3,000-5,000 years ago, which led to a drier climate, appear to have caused substantial population declines and subsequent loss of genetic diversity.

The research findings indicate that climate has been the key factor in reducing the devil population and will continue to endanger the animals if Australia's climate predictions are accurate and it becomes hotter and more arid.

Lead author, PhD student Anna Brüniche-Olsen, said the devil population used to be widespread in Australia but is now restricted to Tasmania.

The low-genetic diversity, combined with the spread of DFTD, has raised serious concerns for the species' long-term survival.

“We investigated the origin of the low genetic diversity by inferring the species’ population history. Using informative DNA markers from more than 300 devils combined with modern statistical methods, we inferred past population dynamics of the species.

“Our results show extensive population declines across Tasmania occurred at the same time as environmental changes around the last glacial maximum and following unstable climate related to increased ‘El Niño–Southern Oscillation' activity. During these times the genetic diversity of the Tasmanian devil has been severely reduced,” Anna said.

“Low genetic diversity is a major extinction risk,” said co-investigator Assoc Prof Jeremy Austin from the University of Adelaide.

“Our new research shows that devils didn’t lose genetic diversity rapidly in the last 200 years as a result of human activities. Instead they have survived for thousands of years with low diversity.”

“The work is a good illustration of how biologists these days need to be increasingly adept with mathematical and statistical techniques to be able to answer questions of this nature,” said co-investigator Assoc Prof Barbara Holland.

Information released by:
University of Tasmania, Communications and Media Office
Phone: (03) 6226 2691 or 0447 537 375
Email: Media.Office@utas.edu.au