

MEDIA RELEASE

NEWS FROM THE UNIVERSITY OF TASMANIA

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ATTENTION: Chiefs of Staff, News Directors



Devils respond in first known case of disease causing early breeding in mammals

Young Tasmanian devils are breeding early in a fast response to the devil facial tumour disease which kills them young, University of Tasmania scientists have discovered.

But they warn that the response may not be sufficient to prevent devil population decline and possible extinction within 20-25 years - although it may slow progress of the disease.

In a paper published today (July 15) in the prestigious US journal, *Proceedings of the National Academy of the Science (PNAS)*, the researchers state that to their knowledge this is the first known case of infectious disease leading to increased early reproduction in a mammal.

The scientists outline data from five Tasmanian study sites to show that a majority of female devils are responding to the disease by breeding when they are one-year old instead of the usual two years.

In addition, instead of breeding about three times in a lifetime most are breeding only once before they die. According to researcher Dr Menna Jones from UTAS School of Zoology, many devils may not survive long enough to rear their litter.

“We have found that devils are compensating for the disease by breeding early – there is a sixteen-fold increase in the number breeding at the age of one year,” she said.

“The devils are under intense selection for early breeding because the disease is 100 per cent fatal. Any devil that’s successful in breeding more than once is putting out more of its genes into the pool of survivors.”

Scientists conjecture that the early breeding may have been encouraged by the greater abundance of food available to the lower density of surviving devils.

Dr Jones said the advantage for scientists of this response in devils is that they are in a unique position to observe the outcome.

“The devil facial tumour disease is here to stay for quite some time and we may be able to see it through an evolutionary event.”

The paper in PNAS was researched by Dr Jones and her PhD student, Shelly Lachish; Professor Hamish McCallum, Rodrigo Hamede, Clare Hawkins and Heather

Hesterman, UTAS; Professor Andrew Cockburn, ANU; Diana Mann, David Pemberton, DPIW, Tasmanian Government.

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DEVIL ADAPTATION FACTS: from *Life-history change in disease-ravaged Tasmanian Devil Populations*, Proceedings of the National Academy of the Sciences

- Scientists analysed data from five devil populations where individually marked devil populations have been studied both before and after the arrival of the disease;
- The disease has had highly significant effect on the age structure of devil populations at all five sites. More older animals were present in the population before the disease: many fewer older animals were found post-disease.
- Before the disease female devils began seasonal breeding at age two, produced a litter annually for three years and died aged five or six. Records of early breeding are rare.
Post-disease females are largely semelparous – that is, have only one breeding opportunity.
- Substantial increases in early breeding by one year-old females occurred at four of the five sites. At the fifth site, Little Swanport on Tasmania's East Coast, a cause for the lack of increase in early breeding cannot be determined given the snapshot nature of the data and may be due to chance.
- Any ability in devils to increase lifetime reproductive output beyond one litter or even rear a single litter to independence before death from cancer should also enhance the fitness of those individuals.
- The scientists suggest that DFTD is a novel, strong selective agent for life-history change in the Tasmanian Devil that might lead to rapid adaptation towards a population genetically and demographically more robust to the effects of DFTD.
- Although the ability to switch to early reproduction offers some prospect for persistence and recovery, the prognosis of this iconic species remains uncertain.