

Not survival of the fittest for Tassie devils

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Fit and healthy Tasmanian devils are being taken down by deadly facial tumors that are attacking the 'best' animals. Credit: Creative commons.

Fit and healthy Tasmanian devils are being taken down by deadly facial tumors that are attacking the 'best' animals in the population, according to novel research led by Griffith University.

The research, published in the scientific journal *Ecology Letters*, shows that devils that catch devil facial tumour disease (DFTD) have higher survival and reproductive rates prior to disease-induced death than individuals that do not become infected.

Typically infectious diseases affect mostly older, younger, or less healthy individuals. However, the team of scientists from Australia and the US, led by Dr Konstans Wells of Griffith's Environmental Futures Research Institute (EFRI), found that devils with higher fitness are at highest risk of infection and death from facial tumours.

Dr Wells said this was probably because of the disease's mode of transmission among socially dominant individuals.

"It's an important finding, as it indicates that the fittest devils, which are the ones typically engaging in mating or aggressive behaviour, are at highest risk to acquire tumours," he said.

Devil facial tumour disease - a proliferating cell line that grows into deadly tumours - is among only a few known cases of transmissible cancer and is believed to be transmitted when devils bite each other.

Ten years of intensive field surveys of devils collected by study authors Dr Rodrigo Hamede and Associate Professor Menna Jones of the University of Tasmania, combined with a novel statistical modelling approach to assess infection dynamics and tumour growth, led to the findings.

Professor Hamish McCallum, also from EFRI, said the findings contradicted conventional wisdom that infection of relatively weakened individuals was commonplace in the spread and persistence of diseases.

"It's more commonly thought that infectious disease attacks the weakest

members of a population - for example, our annual flu epidemics are primarily a problem to the old and otherwise sick," he said.

"But this disease is a bit different. It shows that animals which are otherwise very "fit" (in the evolutionary sense) are exactly the ones that the disease takes out.

"We don't know quite why this is the case, but a good hypothesis is that what's going on is that it's the socially dominant animals that are most likely to contract the disease, because they initiate most of the aggressive and mating encounters and we know that the disease is spread by biting."

Professor Andrew Storfer, of Washington State University, said the study also revealed how resistance to the disease may be evolving.

"Our results show a recent decline in the likelihood that devils become infected. This could indicate some evolving resistance of devils to the cancer, as recently shown by researchers from our team," he said.

More information: Konstans Wells et al, Infection of the fittest: devil facial tumour disease has greatest effect on individuals with highest reproductive output, *Ecology Letters* (2017). [DOI: 10.1111/ele.12776](https://doi.org/10.1111/ele.12776)

Provided by Griffith University

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