



DEPARTMENT of
PRIMARY INDUSTRIES,
WATER and ENVIRONMENT

Devil Facial Tumour Disease

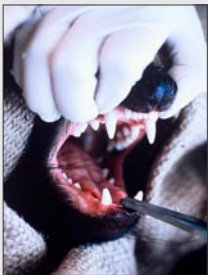
Newsletter March 2006

In this issue:

2 What we know about the disease.

2 Mapping the disease

3 DFTD under the microscope



4 Latest trapping results

4 Management programs



6 Remote sensor cameras

Welcome

Welcome to the first of our newsletters aimed at keeping you informed about the progress being made with the response to the Devil Facial Tumour Disease.

I am delighted to be appointed as full time Program Manager and looking forward to supporting the work of everyone involved in the devil disease program. It's remarkable to see the progress that has been made in the last two years and how knowledge about the nature of the disease is increasing so dramatically.

The efforts of those who have been working on the project to date have been amazing, and are recognised nationally and internationally.

The next stage of the program is full of challenges and will demand a high-level of planning and integration. I look forward to working with DPIWE officers as well as with the many research institutions, wildlife parks and volunteers who are all playing important roles in the ongoing work.

The partnerships being developed with Tasmanian wildlife parks, and with universities and other institutions, are a major part of the response to the devil disease and will play a significant part in our ultimate success in maintaining viable healthy Tasmanian devil populations in the wild.



Steven Smith

STEVEN SMITH
Manager, Devil Facial Tumour Disease Program

ISSN 1833-4954

What we know about the disease

Devil Facial Tumour Disease (DFTD) is a fatal condition in Tasmanian devils, characterised by cancers around the mouth and head. The cancers begin as small lesions or lumps in and around the mouth. These quickly develop into large tumours on the face and neck (and sometimes other parts of the body). Devils with facial tumours find it difficult to eat. They usually die within 3-8 months of the lesions first appearing — a result of starvation and the breakdown of body functions.

DFTD is a recently identified disease. What was possibly the first case of the disease was observed in the north-east of the State. Statewide surveys have indicated the disease is now present in devils across more than half of Tasmania: specifically the area in which devils were much more common.

Substantial work is continuing to try to mitigate the impact of DFTD on the Tasmanian devil population. A major project comprising laboratory investigation of the

disease, field monitoring and implementation of management strategies is underway and important progress has been made in our understanding of DFTD and its impacts.

In response to the potential impact of DFTD, the Tasmanian Devil has recently been listed as a vulnerable species under the *Threatened Species Protection Act 1995*.



Mapping Devil Facial Tumour Disease

Devil Facial Tumour Disease has been confirmed in animals at 35 monitoring sites across northern, eastern, central and southern Tasmania.

Diseased animals have been reported as far south as Geeveston and as far west as Cradle Mountain, Derwent Bridge and Adamsfield.

However, there is still no evidence of DFTD in north-west and west coast populations or Narawntapu National Park.

Surveying has found that although the disease is present in devils across more than half of the State, its effects are obviously most noticeable where devils are more common.

At Mt William National Park, where DFTD is thought to have been present longest, estimates indicate that devil numbers have dropped by 80 per cent since the first sighting.

DFTD under the microscope

Scientists from the Department of Primary Industries, Water and Environment, working co-operatively with other research institutions including Murdoch University, are investigating DFTD and have made some significant breakthroughs in our understanding of this new disease.

Laboratory work at Mt Pleasant in Launceston has already built up a bank of knowledge on what we know about the disease.

Blood, tissue, and tumour samples from hundreds of animals have now been examined by the team to help define the disease itself as well as understand the body function of diseased and non-diseased animals. This work helps us to differentiate between the DFTD and other types of cancer and also to identify diseased and non-diseased animals.

Early investigations of the disease suggested a virus as a possible cause for the DFTD, however cellular investigations have so far not indicated a viral cause.

Scientists are continuing investigations in partnership with Murdoch University in Western Australia into the origin of the cancer cells involved. Where the cells originated from in the body can often give good indicators towards the cause of the cancer. At this stage investigations indicate the cells may originally be neuroendocrine type, although work is ongoing in this area.

One of the most exciting aspects of the laboratory investigations so far, has been the recent peer-reviewed publication of work by DPIWE cytogeneticist Anne-Maree Pearse



and technical officer Kate Swift. Their work, published in the international *Nature* journal, indicated that the method of transmission of the disease between animals was consistent with direct cell to cell transfer of cancerous cells between animals.

Studies of the chromosomal structure of the tumours by the two scientists interestingly found that there had been a complex re-arrangement of

the chromosomes which was identical in all studied. The research found that in all the tumours studied there were only 13 chromosomes, as opposed to the normal 14 in devils, and all were grossly abnormal.

The identical chromosomal re-arrangements support the theory that the cancer is transmitted by allograft when cancerous cells are directly transmitted between animals. Only one other type of cancer is known to behave similarly — a veneral cancer found in dogs. The research by the scientists suggests that not only is the devil's cancer directly transmissible but that the infective agent is a rogue cell-line that evolved in a tumour of unknown origin.

Scientists also continue to investigate why the devils' immune systems does not seem to respond to DFTD. Normally the presence of cancerous cells would trigger an immune response. No immune response seems to be occurring in infected devils.

At this stage, there is no test that enables DFTD to be diagnosed prior to the appearance of lesions and tumours.

Management programs

As more is learned about the disease, it provides the opportunity for management strategies to be identified and implemented to combat the impacts of DFTD. These strategies are aimed at protecting populations in the wild as well as developing strategies for captive populations.

Conservation Management of Wild Populations

A field trial to test the effectiveness of suppressing DFTD in the wild is providing early promising results.

Wildlife staff have been working on the Tasman Peninsula in the State's south east to examine whether removing diseased animals from wild populations can assist in keeping the level of disease low and preventing the population being drastically impacted.



The Tasman Peninsula was chosen because its physical geography minimises the entry and exit of animals, offering a good

opportunity to test disease suppression in the wild. Land access between mainland Tasmania and the peninsula is via a bridge across the Denison Canal. This allows for further isolation of the site by restricting the movement of diseased devils onto the peninsula.

A pilot field trial began in June 2004. Monitoring indicates a very low prevalence of disease in the area. The trapping program also enables diseased devils to be removed from the peninsula.

Results so far are that diseased devil numbers are remaining low and the age structure of the population is not being affected.

Continued next page ...

Latest trapping results

As part of improving our understanding of the disease, surveys are being undertaken at certain sites around the State several times each year. These surveys are to help us identify areas where the disease may or may not be present, as well as to find out how the disease is impacting upon populations, to show if there are signs of recovery, and to further our understanding of how the disease behaves in the wild.

Reports on our website contain results from previous survey programs. In late 2005, trapping was carried out at two locations regularly monitored to assess the impact DFTD is having on devil populations.

At **Fentonbury**, 57 devils were trapped. Six were found to have signs of DFTD. Amongst them was a female devil which has now had DFTD for eleven months. This is the longest that any devil with the disease is known to have survived. Also trapped was a juvenile (less than two years old) with DFTD.

At **Bronte**, 35 devils were trapped. 13 were suspected diseased. Six juveniles were found to have DFTD – the highest number of young devils with the disease ever trapped at the site. Prevalence of the disease at this site was very similar to the level recorded at the same time last year, possibly indicating that there may be a peak period of transmission during mating season but further research is required in this field. The Bronte population now contains very few older animals.

Managing the devil population

... from previous page

DFTD Project Wildlife Management Officer, Dr Menna Jones, said the local community and tourism operators deserved recognition for their support. "Local land managers have given us access to their land to undertake the trapping program," she said. "Similarly, one of the wildlife parks has played a major role in our research program, at its own expense, to assist in making this trial a success".

The next stage of the program is to identify ways of better securing the peninsula as well as ramping up the trapping / disease suppression effort. We also plan to use remote cameras to detect diseased devils that are evading traps. A "devil-proof" system is being trialled for possible use in restricting devil access to the Dunalley Bridge. "The bridge is the only land access to the peninsula so we do have a chance to look at ways of protecting the wild population from the further movement of diseased animals into the area," said Dr Jones.

Captive Management

An important step in the management of DFTD has been the creation of an insurance population of Tasmanian devils as a precaution against the spread of the disease in the wild.

Young devils, from areas of the State where no disease was recorded, were taken into secure quarantine facilities early in 2005 and are being monitored to ensure their disease-free status. These founder animals will be transferred to mainland zoo and wildlife park breeding programs. This insurance population will be an invaluable genetic pool for the future.



A comprehensive captive management plan is being developed to manage them and will be finalised shortly. The plan is being prepared in conjunction with the national industry body — the Australasian Regional Association of Zoological Parks and Aquaria (ARAZPA).

The plan will initiate strategies to maintain genetically-representative captive devils that are disease free. This is an important step towards a program capable of providing animals for wild release in the future.

The captive quarantined population will obviously be an important part of maintaining the genetic diversity of devils for the future. The plan recognises the need for new, disease-free founder animals to establish and maintain an insurance population of devils and outlines genetic and demographic management strategies for the population.

Continued next page ...

Captive management



... from previous page

Wildlife parks around Tasmania are also an important part of work to raise awareness of the species in general as well as playing an important role in programs investigating the disease. At this stage DFTD has not been recorded in any local wildlife parks, highlighting the value of their captive populations.

One wildlife park is home to devils orphaned by the disease which are being monitored as part of understanding whether the disease is transmitted from mother to offspring. Another, in the south east, is involved in trials to help devil proof the Tasman Peninsula as well as other scientific investigations.

Remote sensor cameras

Remote sensor cameras are now being used as a monitoring tool, following successful field trials. The cameras are particularly valuable in remote, hard-to-access areas and also for use in low-density devil populations where the effectiveness of physical trapping is limited.

The new technology consists of photo-trapping units — twin digital cameras triggered by a passive infra-red system. Devils are lured into the area by either a natural or chemical attractant placed at the site.

Some of the latest camera monitoring surveys were conducted near Little Navarre River and in the Mount Arrowsmith-Lake Burbury area. Six cameras were set up at the Little Navarre River site and two devils with the appearance of DFTD symptoms were photographed. Further west, additional cameras were used for ten days. A total



of 220 photos of devils were taken there during that time — none of the animals showing any sign of facial tumours. The cameras have performed well in a range of conditions, including snow!

The camera system records high quality images that allow field staff to recognise individual animals by body-markings and scarring.