Sympathy for the Devil

IDEAS EMERGE TO SAVE THE DYING TASMANIAN DEVIL **BY WENDEE HOLTCAMP**

During the past 10 years, a contagious and fatal cancer has decimated the world's Tasmanian devils. Pustulant tumors that become infested with maggots deform their faces, forcing teeth from their jaws. The devils eventually starve, but not before passing on the virulent cancer. Concerned that the disease could wipe out the devils, conservationists have already started planning how they might reintroduce the species if it goes extinct.

Resembling a small black dog with white splotches, these marsupial carnivores once lived in mainland Australia but today remain only on its island state of Tasmania. Devils have a ravenous appetite, an unearthly growl and a bone-crunching jaw strength that they use to devour carrion—skin, bones and all.

Around 1996, devils with the tumors started appearing in northeast Tasmania. Devil facial tumor disease (DFTD), as it is formally called, spread rapidly and now covers at least 56 percent of Tasmania—an island slightly larger than West Virginia. "In the areas where the disease has been for some years, we've seen an 80 percent population decline," says biologist Menna Jones of the Tasmanian Department of Primary Industries and Water (DPIW). "There's been no population recovery. They're incurring no resistance. There's very few animals over the age of two." Devils normally live six to eight years.

The animals' own demeanor contributes to the spread of DFTD: when the whirling dervishes fight and bite over a carrion meal or a mate, a diseased devil transfers cancer cells that infect the other individual.

Scientists initially suspected a virus but were unable to isolate one. Then Anne-Maree Pearse of the Tasmanian DPIW made a serendipitous discovery: devil DNA has 14 paired chromosomes, but devil tumor cells had only 13—and all had identical chromosomal rearrangements. Cancer tumors typically show genetic corruption, but having identical rearrangements would be nearly impossible. The best explanation: a rogue cell line emerged in a single devil that has taken on an infectious, cancerous existence.

With the population plummeting and scientific answers potentially years away, conservation biologists are preparing for the worst. In 2006 Australian officials designated the once abundant species "vulnerable to extinction" and shipped 47 disease-free devils to mainland wildlife parks in "Project Ark"—a last-ditch effort to preserve the genetic diversity of devils across Tasmania for captive breeding.

An isolated 250-square-mile peninsula off southeast Tasmania may be a key for possible reintroduction. The Tasman peninsula once housed the world's worst criminals; trained dogs, fences and armed guards kept escaped prisoners from reaching the mainland. That siege mentality may help keep sick devils out and healthy ones in. Researchers plan to build a bridge over the peninsula's single narrow access point that will include water jets, spotlights and a cattle grid that devils cannot cross.

Research is suggesting other DFTD-beating strategies as well. Jones currently supervises an experiment to see whether removing infected devils can slow the cancer down. The first year's results offer hope. "We have shown that disease suppression can be used to limit spread of the disease and can be used to prevent population decline," she explains.

Jones acknowledges that, despite imperfect information, biologists must move rapidly. The demise of the devil could cause cascading effects in Tasmania's ecosystem—especially since someone recently introduced red foxes to the area, a carnivore that has driven several local species to extinction. Devils can competitively keep fox populations down, because they fill a similar niche.

At this point, there is no single miraculous solution for saving the Tasmanian devil. Biologists still cannot even detect DFTD before tumors appear. But with millions of dollars being pumped into research, "Taz" may just be able to whirl and fight his way into the future.

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COURTESY OF TASMANIAN DEPARTMENT OF PRIMARY INDUSTRIES AND WATER

FACIAL TUMOR DISEASE badly deforms Tasmanian devils and threatens to wipe them out.

CONTAGIOUS CANCER

Just how the transmissible tumor that is killing Tasmanian devils arose remains a mystery. A genetic mutation is the most likely answer; researchers initially suspected a cancer virus but thus far "we've found no viruses," says veterinary pathologist Richmond Loh of the Tasmanian Department of Primary Industries and Water. The facial tumor disease, which is only one of two contagious cancers (the other being canine venereal tumor disease), somehow evades the devil's immune system. The failure of the immune system to recognize the tumor as "nonself" may be a consequence of the low genetic diversity of the devil.

Devils in Tasmania's isolated northwest corner have distinct genetic differences from the general population. Because the disease has encroached on that region only slowly, biologists are studying whether these genetic differences may confer disease resistance.