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Taming Australia's Wild Kingdom

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Hormone-suppressed foxes, daughterless fish, sterile rabbits. These are just a few of the biotechnology weapons that could be used to snuff out feral animals running roughshod over the Australian continent.

Isolated for millions of years, Australia's native ecosystem has been altered dramatically since European settlement in the late 1700s. Rabbits, foxes, Indian myna birds, feral cats, European carp, cane toads and countless other exotica are now well established -- crowding out unique and docile locals. In the past 200 years, nearly half of Australia's native mammals have disappeared, the worst record of mammalian extinction in the world.

For years, the war on feral animals has been fought mostly with poisons, traps or gunshot -- the so-called mortality solution. But biotechnology research is opening up a new line of attack: fertility solutions that target procreation instead.

The least controversial weapon may well be "[daughterless carp](#)." In this technique, scientists tweak the genes of the slimy, bottom-dwelling European sucker fish so that only male offspring are born. Over several generations, the females vanish, and so do all the others.

Researchers hope that if this method proves successful with the carp it might be applied to other pests, such as the poisonous cane toad.

Problem is, breeding the females out of the carp generations could require 10-plus years of continually stocking streams with the genetically altered fish. Total eradication could take 20 to 30 years.

Another fertility solution, known as the "Achilles' heel," attacks species' specific vulnerabilities.

The poster animal for this method is the European red fox, introduced into Australia from England in the 1870s. The fox's Achilles' heel is that it only breeds once a year in midwinter -- a habit few native Australian animals share. Seeding traps in midwinter with fox hormone suppressants thwarts the breeding cycle.

A third technique under investigation is [immunocontraception](#), which works by tricking a female animal's immune system into attacking and destroying her own eggs.

This method is used in the United States to control deer populations. The immunocontraceptive is administered through injection, a process suitable only for limited-size populations.

By contrast, Australia is overrun by millions of rabbits and periodically devastating plagues of mice. Researchers are looking at faster, cheaper ways to spread immunocontraception. One method being studied involves attaching the contraceptive to a virus that spreads naturally through a particular pest population.

Research into virally distributed immunocontraception is in the early stages, said Tony Peacock, head of the Australian government's [Cooperative Research Centre for Pest Animal Control](#) in Canberra. Scientists must perform extensive field trials and make sure the methods are supported by the public. Any practical application is unlikely before 2006.

But given growing public concerns over genetic engineering (think crops and cloning), and viruses (think anthrax), Peacock acknowledged that researchers could face a tough sell persuading the public that spreading new viruses is a good idea.

But he is confident that Australian authorities won't release immunocontraception virally until the technique is proven safe. At this point, he said, the technology has clear economic applications elsewhere -- Asia and Africa in particular, where rat plagues destroy valuable crops.

But its Darwinian principles are what skeptics worry about.

One such worrier is Des Cooper, a professor of biological science at Sydney's Macquarie University. Among other things, Cooper worries that immunocontraception-thwarting "super mum" rabbits or mice could emerge, or that the viruses might hurt other animal species. Given these concerns, Cooper said scarce research dollars might be better spent on less controversial technologies.

And, after all, one ecosystem's pest is another ecosystem's native animal. It's not inconceivable that gene-tweaked fish, hormone-suppressed foxes or virally sterilized rodents might somehow find their way back into their native ecosystems.

"We don't want to create a technology that destroys animals where they're supposed to be," said Clive Marks, head of vertebrate research at the state of Victoria's Institute of Animal Science. "That would really defeat the purpose."