

ENDANGERED SPECIES

Emerging virus threat

Washington

In January, a small group of golden lion tamarins waited in a holding facility at the National Zoological Park for a trip to Brazil. Eleven of the foot-long monkeys were to be released into the wild as part of the zoo's reintroduction campaign for endangered species. Then, three days before the tamarins were scheduled to leave, zoo pathologists discovered that one of the monkeys posed a potential threat to South American wildlife. The tamarin was carrying antibodies against the callitrichid hepatitis virus (CHV), an infectious organism that has recently struck primate populations in nearly a dozen US zoos. Indigenous to Old World primates, the virus has never been seen in the New World outside captivity.

The pathologists, who already knew the tamarin to have been exposed to CHV, learned at the last minute that the virus could be transmitted to other animals through rodents — a discovery that made it much more threatening. If the monkey had carried CHV into the wilds of Brazil, where the virus has never been seen, it might have spread to other primates and other susceptible species.

The consequences would be impossible to predict. The virus might have died out with no effect. But the pathologists had to consider the worst-case scenario — that the virus might have caused a plague that would devastate some vulnerable species.

The experience with the tamarins highlights a dilemma facing reintroduction programmes. Although the value of importing endangered species back into their natural habitats is unquestioned, some researchers are now beginning to reexamine the safety of such campaigns.

The danger arises from what are known as 'emerging viruses'. Like AIDS and hepatitis, emerging viruses are previously non-threatening viruses that can decimate new populations by acquiring fresh hosts and vectors — often with the unknowing help of humans who introduce new species into virgin environments. Canine distemper, for example, has wiped out the black-footed ferret in the wild and was most probably introduced by domestic dogs.

Reintroducing an existing species into Does this golden lion tamarin carry an 'emerging virus'?

an epidemic, especially when those animals have been exposed to the cocktail of viruses that proliferates in a zoo. In the case of the hooded crane, a probably foreign herpes virus has slowed reintroduction and further endangered the last of the surviving wild population.

"It's a very serious potential problem," says Benjamin Beck, associate director for biological programmes at the National Zoo. "It's only because of our advanced diagnostic facilities that we were able to catch this virus. Who knows what else is going

through?" In response, some countries have essentially prohibited reintroduction by instituting such strict import regulations that even animals only recently removed from the wild cannot be returned.

Yet most researchers believe that they have little choice but to go ahead, albeit cautiously. Devra Kleinman, the National Zoo's assistant director for research, says, "To maintain maximum genetic diversity we're going to have to inject animals into the wild. Plague is a risk, but it's a risk we feel we have to take."

Six other US zoo programmes are participating in reintroduction and breeding projects for tamarins, among some 55 other endangered species that are now being reintroduced. To minimize the danger of an epidemic, zoo staff quarantine tamarins for several months before reintroduction, during which time the animals are examined for parasite eggs, viruses and genetic problems. "We check for the things we know," says zoo pathologist Richard Montali. "Anything that we can treat, we treat. Any animals we have questions about, don't go." Overall, about 15 per cent of the tamarins are disqualified for one reason or another.

After the animals are released in Brazil, seven zoo specialists observe them every day over a six-month quarantine period in a remote area away from wild tamarins. If the researchers spot signs of a disease outbreak, they can trap and remove the monkeys within hours.

IMAGE
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National Zoological Park

foreign pathogens and parasites. Some of the viruses affect the animals themselves, others may simply use them as a carrier.

In the case of CHV, pathologists believe that rodents carried the organism from Old World to New World primates at a zoo, probably through the baby mice (known as 'pinkies') with which the tamarins are fed. Another tamarin disease, caused by a parasite found in bush babies (small simians that are also kept at the National Zoo) appears to use insects as its vector. Cockroaches, which are as common in the tamarins' zoo quarters as they are in nearby Washington apartments, are a favourite tamarin snack and the chief suspect in that case.

"The diseases are evolving faster than we are identifying them," Kleinman says. "The parasites are constantly changing to keep one step ahead of the hosts."

Such a moving target makes complete screening impossible in reintroduction programmes. New viruses are going to get through, if they have not already. Zoo officials hope that they can screen out the worst of the risks, but they admit that they are gambling on good luck and quarantines.

"When we decided in the beginning to go ahead with the reintroductions, we didn't know exactly what the risks were, and we still don't," Kleinman says.

The researchers point out that other human activities, from agriculture to ecotourism, are also bringing new diseases to wild populations. "We're exposing Brazil to less risk by exposing it to our tamarins than we are by exposing it to ourselves," Beck argues.

While that may be true for the country at large, something like an infected tamarin can be the ultimate nightmare for the species that the researchers are trying to save. Unlike the zoo-bred animals, the wild populations have not had generations in which to become immune to the foreign virus.

Most researchers agree that the best solution in many cases would be *in situ* conservation — the breeding and management of endangered species within their natural environment. If the animals can be protected in areas near where they are naturally found, the risk of their being exposed to new diseases is minimized.

But conservation programmes are expensive, and most are funded by zoos, which in turn depend on public support. Although reintroduction programmes may be intellectually attractive, people are unlikely to support the effort if they cannot see the animals.

So most zoos, strapped for cash, continue to run their reintroduction programmes in the high visibility of captivity. They screen for what diseases they can, and hope for the best with what they miss. "It's an area where we're playing God," says Michael Hutchens, director for conservation and science for the American Association of Zoological Parks and Aqauria. "But we don't have a lot of choice."

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