

Captive breeding 'weakens' beasts

Animals bred in captivity to help conservation programmes can quickly become less fit for survival in the wild, research suggests

by Richard Black
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US scientists found steelhead trout reared in hatcheries were much less good at reproducing than wild fish.

Writing in the journal *Science*, they say the use of captive breeding needs careful re-consideration.

For some animals, such as amphibians, captive breeding is being used more and more as wild habitats disappear.

"This study proves with no doubt that wild fish and hatchery fish are not the same, despite their appearances," said Michael Blouin of Oregon State University in Corvallis, US, who oversaw the research.

Steelhead populations in rivers along the US west coast are listed as threatened or endangered by the US Fish and Wildlife Service. Captive breeding and release is one of the measures being used to safeguard numbers of a fish that is much prized by anglers.

Captive loss

The Oregon State team had previously shown that first-generation captive-reared steelhead were just as successful reproductively as their wild-reared relatives, producing just as many young.

This emphasises that you should do everything to stop them disappearing in the first place - Robert Lacy, IUCN

In the new study, they compared the success of fish hatched from two captive-bred parents with those possessing one captive-bred and one wild parent.

The results were startling, with the first group about 40% less successful than

the second.

"For fish to so quickly lose their ability to reproduce is stunning; it's just remarkable," said Professor Blouin. "If it weren't our own data, I would have difficulty believing the results."

Hatchery programmes for steelhead and other salmonids (species within the salmon family) release more than five billion juvenile fish into Pacific waters each year. So if captive breeding does result in fish markedly less fit and less able to reproduce in the wild, the implications could be significant.

Faults retained

"It's very interesting, and it's not unexpected, it complements what we and other research groups have found for other salmonids," commented Dr Phil McGinnity from the Marine Institute of Ireland.

"The fish are kept in captivity; in domestication, which is basically selection for life in the hatcheries, and in addition relaxation of selection for traits important for life in the wild," he told the BBC News website.

"With wild Atlantic salmon, within two or three months about 90% of the eggs or the fry are dead, so you can imagine that's a large selective effect; whereas in the hatcheries, everybody gets to live, so traits that would quickly be rooted out in the wild are able to survive in the hatcheries. So we're building in that maladaptedness."

As natural habitats disappear, conservationists working on a wide range of species are looking to captive breeding as a bridge to long-term survival.

It is being actively pursued by amphibian specialists, for example. About one-third of all amphibian species are facing extinction, and the combination of virulent disease, habitat loss, pollution and climatic change means there is often little hope of conserving them in the wild; captive breeding and a re-introduction to the wild at some future point may be the only option.

Robert Lacy from the Chicago Zoological Society chairs the World Conservation Union's (IUCN) Conservation Breeding Specialist Group, and he believes the steelhead finding does raise an important concern.

"A key question is whether the animals can re-adapt to the wild when you re-introduce them," he said.

"If they can, this research suggests you still might need to breed more of them than we would have thought, because the reproduction rate in the earlier generations is going to be lower.

"I think what it also implies is that you would want to make your re-introductions as soon as possible, rather than rearing generation after generation in captivity."

Not all species would be likely to lose their reproductive fitness as quickly as the steelhead. But for those that do, the effectiveness of captive rearing and re-introduction as a survival strategy is now less assured; and relying on a continuing release of captive-reared individuals would prevent re-adaptation.

Said Dr Lacy: "The other thing this emphasises is that you should do everything you can to stop them disappearing in the first place."