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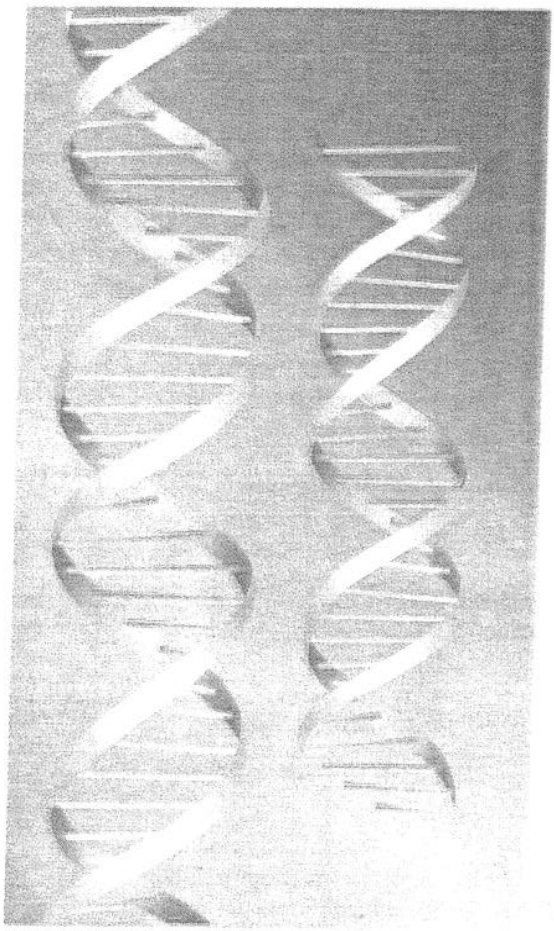
DNA sampling compares success rate of hatchery-based enhancement programs

No Surprise: Best returns from first generation wild fish

A unique study making use of DNA going back many years from ocean-going steelhead trout out of the Hood Canal in the US's Washington State has produced the first data comparing just how successful – or, to be more exact, relatively unsuccessful – hatchery-based programs are in boosting a river's fish stocks.

Dr. Hitoshi Araki, a lead participant in the study from the Department of Zoology at Oregon State University, said he and other researchers used DNA records collected by the US Fish and Wildlife Service over some 16 years to determine just how successful different runs of hatchery fish were in modelling the reproduction of wild fish and in helping to supplement salmonid populations.



Araki said that some biologists and other scientists have been claiming for years that if suitable care is not taken to use native wild fish for spawning purposes, hatchery-produced fish drag down the overall fitness or reproductive capability of the stocks over the years and eventually undermine the hatchery programs' ability to boost fish runs.

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Fortunately, said Aaraki, members of the US Fish and Wildlife Service have been collecting samples from returning sea-run steelhead in the Hood Canal for at least 16 years. The study classifies that as three generations, he said, and that was enough to give them an almost complete sample to perform DNA-based parentage analysis to assess generational lines and what role hatchery fish played in supplementing or undermining the runs.

What they found, said Araki, is that steelhead reared initially in a hatchery from native wild eggs, and then released in order to go to sea and return as spawners, had a reproductive success rate that was indistinguishable from wild fish. Atari and his colleagues call those "supplementation" hatcheries and they can be useful, he said, to boost native populations for just a generation or so, without any obvious genetic damage.

In particular, said Araki, crosses between wild fish and hatchery or "supplementation" fish were also as reproductively successful as the offspring of two wild parents.

But if you continue using hatchery-bred fish to breed with each other and produce more and more direct generations of fish under what the researchers call a "traditional" hatchery program, the fish's ability to revive the stocks in affected rivers drops off significantly.

So-called "traditional" hatchery steelhead identified in the study produced anywhere between about 60 and 90% fewer surviving adult returning to spawn.

"We've essentially created a fish version of white lab mice," Dr. Michael Blouin, an OSU associate professor of zoology involved in the study is quoted as saying. "They are well-adapted to life in the hatchery, but do not perpetuate themselves in a wild environment as successfully as the native-born fish.

Blouin said that the "good news" for hatcheries – is that cutting back on the number of generations of a particular stock being passed through a hatchery can significantly boost the fitness of the stock in the wild. Reducing it to just one generation, said Araki, appears to eliminate any adverse impact.

The researchers did DNA analysis of scale samples taken from more than 15,000 fish in the Hood Canal since 1991.