

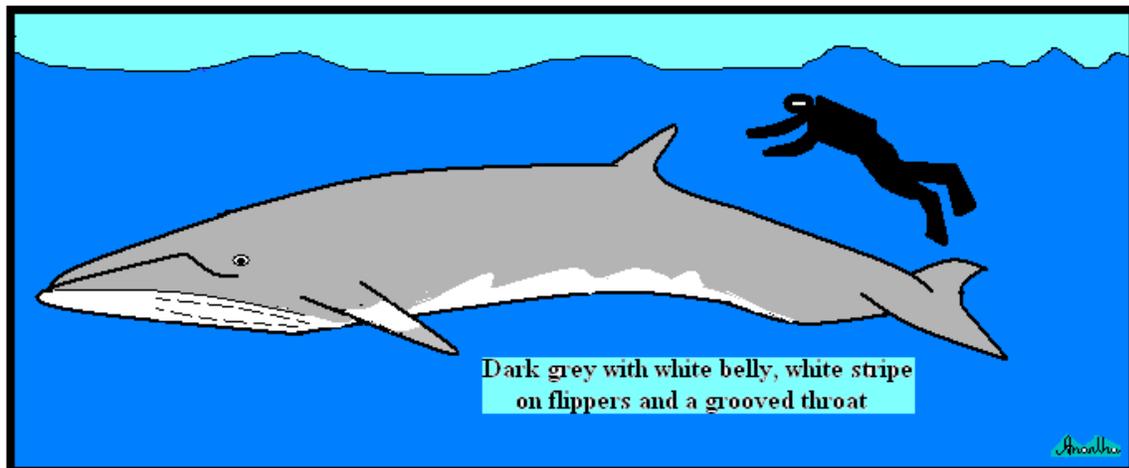
# Statistics exposes whale poaching

That DNA marks every cell in the body makes it versatile tool for the detective, says S.Ananthanarayanan.

Oregon State University scientists used this feature of DNA to crack a difficult problem of how many whales fishermen in the Sea of Japan were snaring.

## Endangered species

The Minke whale or the Lesser Lorqual is a small Baleen whale, the family that includes the Humpback whale, the Fin whale and the Blue whale. It measures about 2.5 metres at birth and 8 to 10 metres when grown. It is dark grey above and has a white belly, with grooved throat and a white patch on the flipper. The Minke is common in the North Atlantic and the Pacific. Although all commercial whaling is forbidden by the International Whale Commission, the Minke is still at risk



In South Korea, whale meat can be sold if the animals had been caught by accident in fishing nets, a 'by-catch', like a 'by-product'. But each such death of a whale needs to be reported to the Government. Between 1999 and 2003, fishermen reported snaring 458 Minke whales. But a question was whether the whole catch was reported. The New Scientist reported last week that Scott Baker and others of Oregon State University in Newport have found that the true catch was nearly twice that number and threatens the survival of whales in the Sea of Japan.

## Counting fish

So how does one find out how many fish there are in a pond? Without catching all the fish, that is. Well, a method is to first catch a fair sample, say a hundred live fish and mark them in some way. One method used is to bathe the fish in a liquid called calcein. Calcein binds with calcium, which is there in the scales of fish, and fluoresces. The stain

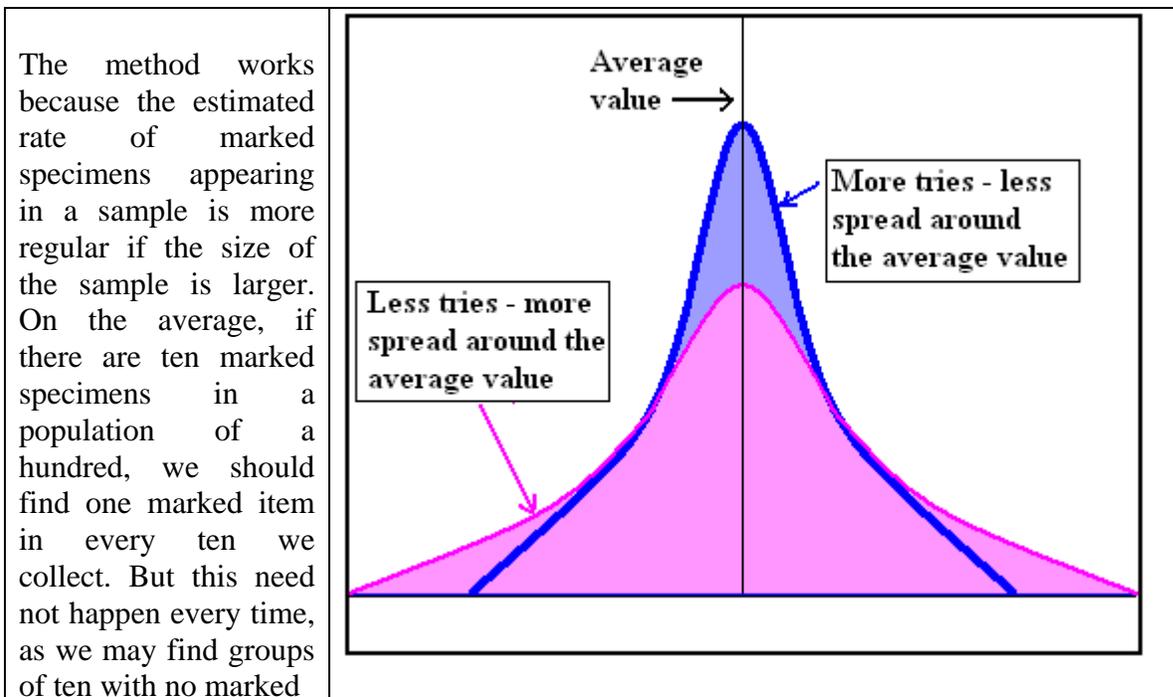
does not wash off for ten to twelve days. The compound has been used in quantifying calcium content of stone, for tracing blood flows within the eye and for examining bone growth in animals. When fish are put in a salt bath followed by calcein immersion, they develop a stain that is detectable without having to sacrifice the fish.

So a hundred fish are marked with calcein and thrown back into the pond. After the fish mingle for a week, another sample of a hundred fish is snared. And we check how many of them have a calcein stain. If half the fish have the stain, it shows that there are two hundred fish in the pond. If only a tenth of the fish are stained, then there are a thousand fish, and so on.

### Minke in the market

But how does this help trace and count whales that have been illegally killed? The scientists collect whale meat from the market and use DNA fingerprinting to determine how many whales the meat came from. This data alone, which was only a sample, cannot trace all the whales killed. But it turns out that the regularity with which this data appears also indicates the proportion of the sample to the total population.

So they went on to the 'mark and recapture' method, which ecologists use to estimate different animal populations. With the population estimated, successive surveys of the appearance of marked whales in the market could reveal the number of whales that had been killed.



item or sometimes with more than one item. But if we took a sample of twenty, then, again, it is not necessary that we would find exactly two items. But the behaviour is

more regular in a sample of twenty than in a sample of ten, with a closer approach of the mean to the real average.

In this way, by looking at the how wide or narrow the variation was in the rate of DNA of identified whale was turning up in the market, the scientists were able to find out what percentage of the population sample must have been, and hence the correct number of whales being killed!

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