
Conservation
10 Solutions to Save the Oceans

Fingerprinting a bowl of SHARK FIN SOUP

A single pound of dried shark fin can retail for US$300-400. Most fins end up in shark-fin soup or traditional medicines. It's a growing, multibillion-dollar industry; by some estimates, 100 million sharks are killed annually for their fins.

Hong Kong handles 50 to 85 percent of the world's imports. Although sharks are finned all around the world, fins from Europe currently dominate the market, accounting for about 30 percent of the total. Of these, most are harvested by Spanish fishing fleets. Shark-fin products are consumed across China and much of eastern Asia.

Only three sharks have protection under CITES; the white, basking, and whale sharks all appear on Appendix II, which allows trade only under permit. For other sharks, protection is patchy and often depends on where the animal was caught. That makes policing the trade extremely difficult, particularly when customs officials have nothing more than a fin to identify.

But Mahmood Shivji can tell a lot from a single fin. Shivji, director of the Guy Harvey Research Institute in Florida, and colleagues discovered in 2005 a short stretch of DNA unique to each of 14 shark species. It was like finding a shark bar code. He could identify the species from a tiny sample of flesh or fin and thus distinguish between legally and illegally caught species. The group then developed a chemical reaction to copy the short stretches of species-specific DNA until they were easy to detect. The entire process, says Shivji, is so simple it can be done in a test tube and can take as little as 40 minutes.

The team has developed genetic primers to detect 32 shark species and is able to distinguish between 21 species with a single reaction. Forty to 50 species of shark are important in the commercial trade. Shivji wants to develop tests for them all.

The team's next step is to trace fins back to a specific population. This is vital in monitoring species that are protected in some parts of the world but not in others. In the northern Pacific, the northern Indian Ocean, and off the tropical west coast of Africa, the sand tiger shark is commercially fished for fins, food, jaws, and teeth. However, in North American waters it is protected. To police the sand tiger fin trade, customs officials need a way to distinguish between animals caught in different places.

"We think this is a broadly applicable technique and can be used on anything with DNA. It's a matter of taking the time to develop the species-specific primer to make this something that can be used by enforcement agencies without sending it back to a commercial or scientific lab." Shivji is also looking for funding to make the kit portable so it can be used by the coastguard on board an enforcement vessel or perhaps from a van at ports of landing. It could also be used for routine monitoring and where large volumes of products are being traded. If successful, the kit could transform the way the shark trade is monitored and allow conservationists to work out whether specific populations are exceeding maximum sustainable yields.

The team's work has also verified the existence of a commercial fin trade in white sharks. It had been argued that white sharks were caught only for the trophy trade and thus its protection should be weakened. Today, the white remains the most widely protected shark in the world, with its capture and trade prohibited in South Africa, Namibia, Malta, the U.S., and Australia.

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