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Tests Reveal Mislabeling of Fish

By ELISABETH ROSENTHAL

Scientists aiming their gene sequencers at commercial seafood are discovering rampant labeling fraud in supermarket coolers and restaurant tables: cheap fish is often substituted for expensive fillets, and overfished species are passed off as fish whose numbers are plentiful.

Yellowtail stands in for mahi-mahi. Nile perch is labeled as shark, and tilapia may be the Meryl Streep of seafood, capable of playing almost any role.

Recent studies by researchers in North America and Europe harnessing the new techniques have consistently found that 20 to 25 percent of the seafood products they check are fraudulently identified, fish geneticists say.

Labeling regulation means little if the “grouper” is really catfish or if gulf shrimp were spawned on a farm in Thailand.

Environmentalists, scientists and foodies are complaining that regulators are lax in policing seafood, and have been slow to adopt the latest scientific tools even though they are now readily available and easy to use.

“Customers buying fish have a right to know what the heck it is and where it’s from, but agencies like the F.D.A. are not taking this as seriously as they should,” said Michael Hirshfield, chief scientist of the nonprofit group Oceana, referring to the Food and Drug Administration.

On Wednesday, Oceana released a new report titled “Bait and Switch: How Seafood Fraud Hurts Our Oceans, Our Wallets and Our Health.” With rates of fraud in some species found to run as high as 70 percent, the report concluded, the United States needs to “increase the frequency and scope” of its inspections.

DNA bar coding, as it is called, looks at gene sequences in the fish’s flesh. “The genetics have been revolutionary,” said Stefano Mariani, a marine researcher at University College Dublin, who has published research on the topic. “The DNA bar coding technique is now routine, like processing blood or urine. And we should be doing frequent, random spot checks on seafood like we do on athletes.”

Policing the seafood industry has historically been challenging because even the most experienced fishmongers are hard pressed to distinguish certain steaks or fillets without the benefit of scales or fins. And many arrive in supermarkets frozen and topped with an obscuring sauce.

Older laboratory techniques to identify fish meat looked at the mix of proteins in flesh samples, but were unreliable, expensive and cumbersome. Investigators often relied instead on laborious legwork, tracking inconsistent fish names on paperwork as seafood moved across international borders. Eighty-four percent of seafood consumed in the United States is now imported, often passing through a multistep global supply chain.

With the new genetic techniques, the gene sequence found in a fish sample is compared with an electronic reference library like that maintained by the International Barcode of Life Project, which now covers 8,000 varieties of fish compiled by biologists over the last five years. The testing is now relatively cheap: commercial labs charge about $2,000 for analyzing 100 fish samples, for an average of $20 apiece, but the cost is under $1 per sample for labs that own the equipment.

Douglas Karas, a spokesman for the F.D.A., said in an e-mail that the agency had been working with scientists to “validate” DNA testing for several years. It recently purchased gene sequencing equipment for five F.D.A. field laboratories and hoped to use it “on a routine basis” by the end of this year.

This new type of scrutiny could allow hundreds of thousands of samples to be tested each year, rather than the hundreds that are now rigorously analyzed, said Dr. Paul Hebert, scientific director of the Barcode of Life project, based in Guelph, Ontario. In March, the F.D.A. issued an alert to inspectors about mislabeled fish. It had already used bar coding as irrefutable evidence to prosecute sellers or issue warnings involving seafood “misbranding,” Mr. Karas said, much as prosecutors use DNA evidence in sex crime cases.

But it will take time to clamp down on a lucrative and, apparently, widespread practice. Dale Sims, chief fishmonger for Cleanfish, a San Francisco-based supplier of high-end sustainable seafood, said he’d seen thresher shark labeled as shark, swordfish and mahi-mahi all in the same market, as well as many other obvious substitutions.

“It infuriates me but it’s hard to correct,” he said. “I’m embarrassed to say that there’s been a lot of fragmentation in this industry. So if someone is unscrupulous, it’s been easy to get away with it.”

For consumers, the issue is about dollars and cents — wanting to get the quality and type of fish

they paid for. “If you’re ordering steak, you would never be served horse meat,” said Dr. Hirshfield of Oceana. “But you can easily be ordering snapper and get tilapia or Vietnamese catfish.”

Environmentalists worry that duped diners may be unwittingly contributing to declining fish stocks, buying food they have been told to avoid. Dr. Hebert said that in testing samples from the United States and Canada, his lab had even detected meat from endangered sharks being sold to diners. “If it were labeled endangered species,” he said, “you couldn’t sell it and you wouldn’t buy it, right?”

Most of the research has been done not by regulators but by individual fish biologists and geneticists; to date no definitive national study has been carried out on the scope of the fraud.

Dana Miller, a doctoral student who worked with Dr. Mariani in Dublin studying the mislabeling of cod, the most popular fish in Ireland, said, “we expected with all the policies and legislation and inspections, the numbers would be pretty low.” But 25 percent of samples of fresh cod and haddock and over 80 percent of the smoked products, were in fact something else. Irish cod stocks are overfished.

“If you can’t even trust that the name is right, then how can you trust anything else on the package, including the date?” she said. In Europe, seafood labels include the fishery where it was caught. In the United States, it must list only a “country of origin” although that is often the processing country rather than where it is caught.

The group Cleanfish is experimenting with an electronic tagging system through which each fisherman or processor would enter his code onto a tag on each fish, making its journey from the sea to the plate fully transparent. Cleanfish buys only whole fish since its outward appearance helps to verify its identity.

And bar coding is becoming more accessible every year. Today, fish samples are sent to labs for testing, but scientists predict that there will be desktop DNA bar coding systems within five years and, in 10, inspectors will carry hand-held detectors.

“Everyone should be using this technique — there should be spot checks and fines,” said Dr. Hebert of the DNA bar coding project. “If there were no speed traps and radar checks, there would be a lot more speeding.”