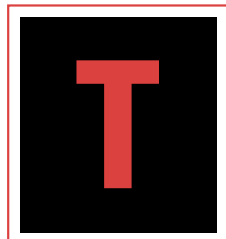




Farmed 'Ahi: The Impossible Dream?

There is money to be made in the ocean. But we may have forgotten how difficult it is to domesticate a wild animal.

BY MARTHA CHENG



THE 'AHI keep crashing into the wall and killing themselves. Syd Kraul has lost almost 100 fish this way. When he first started his re-

search on hatching yellowfin tuna, he put too many fish in too small a space and all 25 died within a day. But even when he was down to his last pair of fish, which he raised from six pounds apiece to 140 over two years without incident, the female whacked into the wall in the night and was found dead in the morning.

In the wild, these fish grow up to 400 pounds, reach speeds of 40 miles per hour and cross entire oceans. To streamline their football-shaped bodies, they fold their fins into grooves, like pocketknives.

In Kraul's 36-foot-diameter tank, the 'ahi usually cruise around in circles. But

they are sensitive to sounds and will spook easily, darting like torpedoes straight into the wall. Read through the tuna domestication reports from research institutions in Panama, Japan, Spain and Indonesia, and you'll find references to walling, wall-strikes and tuna found with their necks broken from ramming into nets and padded walls.

Most animals we eat—cattle, pigs, chickens—have been domesticated for thousands of years. Maybe we've taken for granted how difficult it is to domesticate a wild animal, particularly one that lives in the deep, open ocean. It took almost 100 years to commercially hatch salmon, a much smaller fish residing in shallower waters. Only the Japanese have accomplished something along these lines; Kinki University has spent more than \$50 million over four decades to successfully breed and raise a fish similar to 'ahi—bluefin tuna. The fish, called Kindai, is still extremely limited in availability. In

another project, Kinki collaborated with an Australian company, Clean Seas, to coax bluefin tuna to spawn in a tank, a feat that *Time* magazine listed as one of the Best Inventions of 2009, ranking ahead of the AIDS vaccine.

Kraul is trying to hatch yellowfin tuna, which, in theory, should be easier than bluefin—they're smaller, don't swim quite as fast, and can reproduce at younger ages.

It's been four years since Kraul first tried to domesticate 'ahi. He's burned through \$100,000, all his grant money, but it's just a drop in the bucket compared to the funds spent by full-time tuna research institutes around the world. His tuna tank is one-fifth the volume of the Inter-American Tropical Tuna Commission's in Panama. And he's a staff of one, not counting the feral cats that roam his half-acre at the Natural Energy Laboratory of Hawai'i Authority. You could almost mistake the cats for assistants: Sometimes they climb on top of his tanks to see how the fish are doing.

Right now, not well. Kraul has just lost all his fish—the last adults and their offspring. It turns out baby tuna have a tendency to eat each other. And, even when the size of a thumbnail, they still run into the walls with enough force to kill themselves. Kraul has only been able to keep them alive for about 20 days.

"I specialize in things that are hard," Kraul says, "so my failure rate is high." But

he's had enough successes domesticating wild fish that he's optimistic he can create a successful 'ahi hatchery. "My expertise is in raising baby fish larvae," he says. "I've raised more species than anybody. I'm kind of a pioneer."

He has helped start moi and kampachi farms and successfully raised mahi mahi when no one else could. Alan Wong even offered to buy Kraul's tank-bred mahi, but, by that time, Kraul had discovered the price mahi fetched wasn't enough to cover the costs of raising it and had moved on. Mahi had similar problems to 'ahi—they are fast swimmers prone to walling; they need a lot of oxygen; they don't spawn well in captivity. The males would get so excited in spawning (when the females lay their eggs and the males, like crop dusters, spray them with sperm), they'd jump out of the tank.

Yellowfin tuna is proving to be the hardest species Kraul has ever tried to domesticate. But he has what he thinks is a secret weapon. In his years of larval research, he's cultivated a nutrient-rich feed that has improved larval survival in other species. He's pretty sure it will work on 'ahi, too. He just needs the larvae to prove it. So onward he grinds, round four: Catch the fish, get them to survive in captivity long enough to spawn, get them to actually spawn, raise the larvae until they're big enough to eat the feed he's developed. Simple, right?

BILL SPENCER wants Kraul to succeed because his business may depend on it. He started Hawai'i Ocean Technologies in 2006 based on the concept of raising 'ahi in free-floating oceanspheres.

Overfishing is occurring for bigeye tuna, according to NOAA. Yellowfin is currently abundant, but as the world's population and appetite for this fish grows, it's unclear whether the fish populations can keep up.

Spencer thinks he can save 'ahi by farming it, reducing pressure on the wild stocks. He has permits to cultivate bigeye and yellowfin and a 35-year state ocean

lease off the Big Island.

There is money to be made in the ocean. Spencer is quick to cite impressive aquaculture statistics: It is a \$100-billion industry that now supplies half of all seafood consumed in the world. The United States imports 91 percent of the seafood consumed, resulting in a \$10.4 billion trade deficit, second only to foreign oil. The ocean can make Spencer rich, especially if he can start providing 'ahi if, or when, the world's oceans cannot.]

But it's far from easy money. Hawai'i is littered with failed or troubled aquaculture businesses, some going bankrupt attempting to grow halibut, black cod, oysters, tilapia, freshwater prawns, moi and more. Just last year, Hukilau Foods, at one time supplying 6,000 pounds of moi a week, declared bankruptcy. And it's not just Hawai'i. Clean Seas, the aforementioned Australian company that first raised bluefin tuna in a tank, found the tuna's offspring too weak and shelved the project. This year, the company's net loss was \$34 million.

Spencer spent six years getting permits for his open-ocean aquaculture business, five years longer than he anticipated. He finally has the last permit in hand, which allows him to build one oceansphere with a volume of three million cubic feet, big enough—according to Spencer—to raise 20,000 hundred-pound 'ahi. The wait for viable 'ahi fingerlings, though, could be even longer than the wait for permits. It turns out, figuring out the technology for 165-foot-diameter, free-floating, remote-

controlled, self-feeding cages, two miles offshore, may be easier than convincing fish not to run into walls.

If Kraul succeeds in breeding 'ahi—and Spencer has no doubt that he, or someone else, will—Spencer envisions oceanspheres changing how we view oceans. "The oceans are the last places on Earth where we harvest mass quantities of food from the wild," he says. In his future, we will rely less on wild fish and more on domesticated. In order for it to work, it's not just the seafood landscape that will change, but 'ahi as well. They will have been bred for captivity, in the same way our domesticated cattle are docile compared to their wild ancestors. And 'ahi wall strikes will become a thing of the past. **PAU**



THIS IMAGE: Kraul and his aquaculture tanks. OPPOSITE PAGE: 'Ahi in the wild.

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