

# THE TRAVELING ORNAMENTAL DEFENDER

BY NATHAN GILLES



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## Veterinarian Tim Miller-Morgan is on a mission to help the ornamental fish industry

On the dark muddy waters of the Rio Negro, the Amazon River's largest tributary, aquatic veterinarian Tim Miller-Morgan finds his temporary home and transportation for the fortnight ahead. It's a two-story riverboat that looks like it came straight out of *Fitzcarraldo*, the epic film about an ill-fated, but nonetheless triumphant, Amazon expedition sprinkled with allusions to Joseph Conrad. This fact isn't lost on Miller-Morgan and his companions; they make light of the ominous boat and their own impending expedition by joking about the thematic connection. But their Amazonian journey will be more heartfelt than another *Heart of Darkness*. Over the next two weeks, Miller-Morgan and his companions will travel 500 miles up the Rio Negro with *Projeto Piaba* (motto: "Buy a fish, Save a tree!"), a nonprofit created to encourage the ecological catch and transport of Amazonian fish destined for private and public aquariums.

"The idea was to evaluate the health [of the fish] at each stage of the chain of custody," says Miller-Morgan, reflecting on the Rio Negro trip from his office at the Hatfield Marine Science Center (HMSC) in Newport, Oregon.

Miller-Morgan's specialty is aquatic medicine and health management among fish and invertebrates. He's the Oregon Sea Grant Extension veterinarian as well as the clinical veterinarian for all aquatic animals at Oregon State University (OSU). He leads HMSC's Aquatic Animal Health Program and teaches aspiring aquatic vets the trade's ins-and-outs. But outside OSU, he's best known for his extension work with ornamental fish. This work has included researching the koi herpes virus (see sidebar) and examining how wild-caught fish are handled en route to the aquarium. He did this in the Amazon, where he met with local fishers and traders to help improve their husbandry techniques, and in the past two years alone he's also traveled to India, Japan, Singapore, Indonesia, Israel, Malaysia, and Norway to talk with hobbyists, business members, and professional aquarists about their ornamental fish.

The global ornamental fish trade is a huge but often forgotten piece of world aquaculture, worth about \$15 billion annually. Yes, that's fish for public aquariums and private hobbyists: 6,600 separate species, freshwater and seawater, raised and caught, fish and invertebrates, traded in 100 countries. And while Miller-Morgan says that, overall, the industry is very conscientious about the living creatures they deal in, occasionally—sometimes at their own request—they need help to make things better. This was the case with one of the bigger changes Miller-Morgan helped make happen: the slow but steady improvement in how wild-caught fish are handled.

## Ornamental origins

In 1999 Miller-Morgan was an OSU graduate student working at HMSC's Aquarium and the Oregon Coast Aquarium. As he tells it, he kept receiving calls from ornamental fish owners and businesses that were interested in having Oregon Sea Grant (OSG) get involved in the industry. That same year, the industry held its first Marine Ornamentals Conference in

Hawaii. Miller-Morgan sensed the potential of the unprecedented meet-and-greet and decided OSG needed to attend.

"I thought, 'Well, it's Sea Grant, so maybe the Marine Ornamentals Conference would be the way to get into that [involved in the industry]," he says.

He pitched the idea to OSG, which approved his first travel expenses.

It was in 2001, at the second Marine Or-

namentals Conference, that Miller-Morgan first met representatives from Sea Dwelling Creatures. They told the veterinarian that they were interested in improving how their animals were shipped and cared for. Miller-Morgan said he would be glad to help.

## Catching beauty

Fishers catch them off the coasts of Indonesia, Sri Lanka, Fiji, and the Philippines. They're green chromis, coral beauties, and clownfish, among others. The fish are taken to traders and suppliers, who pack the living gems in thick plastic bags filled with water. They are then air-shipped to their destinations; within 24 hours they can be anywhere in the world. In Sea Dwelling Creatures' case, it's their Los Angeles, California, warehouse.

Miller-Morgan's work at Sea Dwelling Creatures' warehouse began in 2003, when he and six other OSU researchers, with OSG's help, began examining the business's shipping and husbandry practices. The project also included Hollywood Aquarium, which is based in the Portland, Oregon, suburb of Lake Oswego.



Gary Jones

Two young *piabeiros* (ornamental fishers) collect cardinal tetras in a small tributary of the Rio Negro in Brazil.

## In Miller-Morgan's own words...

"The goal of much of this overseas work is to help ensure that better quality fish are imported into Oregon's local fish shops and to provide a more international perspective to the local fish retailers and hobbyists. In fact, on a number of these trips I have been accompanied by owners of local retail and import facilities as well as hobbyists. For example, the trips to Japan were with Tony Prew, owner of All Japan Koi in Hillsboro, who invited me to travel with him and assess health management on the Japanese farms. The other individual is Eric Rasmussen, owner of World of Wet Pets, in Portland.

He accompanied me to Singapore, Malaysia, and the recent trip to Brazil. He provided the very important perspective of the local retailer and the end user to the exporters and fishermen in these countries. Local hobbyists and retailers are typically very disconnected from the international aspects of the industry. My travels and the ability to have local retailers and importers accompany me allow us to bring this international perspective back to the end users and aid them in understanding the broader issues in the trade that extend beyond just the price of the fish."



Tim Miller-Morgan



Edith Ploeg

Eric Rasmussen of World of Wet Pets, Portland, Oregon; Miller-Morgan; and WanLyn Cheah from Greenly Aquaculture, Jahor, Malaysia, collect ornamental fish in a jungle stream, Malaysia.

In Indonesia, [Miller-Morgan] learned that his suspicions were correct: fish weren't being handled properly before leaving the country.



Scott Lapham

Miller-Morgan carries out fish health assessments on wild-caught marine ornamental fish at an export facility in Bali, Indonesia.

At the two facilities, the OSU group examined the skin and gills of the recently shipped Indo-Pacific fish. The researchers looked at the water the animals were shipped in. They gathered tissues samples and performed biopsies. They looked for bacteria in the animals' kidneys. And while collecting all this data, they also trained facility staff to refine their health and husbandry practices.

All told, Miller-Morgan and his fellow researchers looked at more than 400 fish. They saw animals that had undergone trauma, some that had preexisting conditions such as parasitism and bacterial infections, and others that were "dead on arrival." These results surprised them.

"One of the big concerns was that the shipping was a huge stressor," says Miller-Morgan. "We really didn't find that in our work." Instead, he says, most of the problems his group saw hadn't happened in shipping or at the warehouse, but in the countries from which the fish originated. "That made us want to do further work and look at the fish back up the chain of custody," he says.

So Miller-Morgan, with Sea Dwelling Creatures' consent and enthusiasm, worked his way back up the supply chain. This took him to Indonesia, where—as he would do in the Amazon years later—he met with

fishers and traders. In Indonesia, he learned that his suspicions were

correct: fish weren't being handled properly before leaving the country. He discovered that some animals hadn't been fed when they should have been. He found that the shipping water was often of poor quality and not the right temperature. He also concluded that many of the problems he saw could be easily changed with some simple adjustments.

In the years that followed, Miller-Morgan set up a series of training programs that would help reform the supply chain, from the fishers to the sellers. His group also helped train staff at both Sea Dwelling Creatures and the Hollywood Aquarium in animal husbandry techniques, which at one facility led to a 35 percent reduction in in-house mortalities and a 10 percent reduction in "dead on arrivals."

Today Miller-Morgan estimates he has helped build roughly 30 training programs, for industry members, hobbyists, veterinary students, and professionals alike.

Over all, Miller-Morgan says he's very encouraged by the ornamental fish industry's desire to do the right thing and improve its husbandry practices. And, he says,

he's seen a steadily increasing concern for animal welfare, one that corresponds to higher

profits for the industry.

"It's animal welfare," he says, "but it's also providing a higher quality product...and people will pay for better fish."

## Reflections

Today, Miller-Morgan's Newport office is filled with souvenirs and placards from the places he's been and the training and research projects he's participated in. There's a pewter camel figurine from Dubai, ceramic koi from Japan, and awards, lots of them. He says there's still a lot the ornamental industry should do. One of his more recent research projects noted that some industry members and hobbyists were overusing antibiotics, which leads to antibiotic-resistant bacteria that have the potential to jump the species gap from animal to human. "Kind of disturbing," says Miller-Morgan. However, he says, on the whole, the industry is changing for the better, even if that change is often slow. As to his role in that change, he's modest.

"I've seen changes based on the things we've done and the papers we've put out. But we have a lot more work left to do."

# SAVING BEAUTY: researching the koi herpes virus

Early 2004 saw a high-water mark for the koi herpes virus (KHV). A strain of herpes in the same viral family as the human venereal disease, KHV was wreaking havoc on ornamental carp the world over. If an infected animal was introduced to a koi pond, within 14 days as much as 95 percent of the majestic animals could suffer a gruesome end that included severe damage in the gills and lesions on the scales. And like its human-affecting cousin, KHV can lie latent in animals that otherwise appear healthy, which can lead to a steady subterranean propagation. Yet in 2004, not a lot was known about KHV. But that's changed.

In 2008, OSU aquatic veterinarian Tim Miller-Morgan—who had worked with koi hobbyists, via the Associated Koi Clubs of America, and with industry

members to get a handle on KHV—lent his veterinary skills to OSU veterinarian and virologist Dr. Ling Jin, graduate student Kathleen Eide, and several others studying the disease. The researchers discovered KHV DNA in the brains, eyes, kidneys, and other organs of otherwise healthy koi, proving that, like other forms of herpes, KHV was a latent disease able to lie dormant in healthy-looking animals. Miller-Morgan says Jin and Eide's work has made his job as a veterinarian on the frontlines of the disease a whole

lot easier. The researchers' work has led to the development of enhanced screening methods—things like sampling water and fecal matter, instead of the more-invasive methods of the past—and that makes life a little easier on the koi.



Tony Prew, All Japan Koi, Hillsboro, Oregon; and Rodger Meyer, a koi hobbyist from Portland, Oregon, examine some beautiful koi at Konishi Koi, a high-end koi retailer and farmer in Hiroshima, Japan.

Photos this page: Tim Miller-Morgan

