Encounters of the Volitans Kind!

By Robert Di Marco, international lecturer and clownfish breeder

In January 2005, while I was giving a talk on clownfish rearing at the monthly Brooklyn Aquarium Society meeting, my wife, Louise, and I received an invitation from two unexpected audience members. Joe Yaiullo, curator/co-founder, and Todd Gardner, aquarist, of Atlantis Marine World had driven from Long Island to hear the talk. They cordially invited us to tour their wonderful public aquarium.

Todd had mentioned to me during previous get-togethers, that in the fall he and the staff at Atlantis Marine World collect numerous tropical fish that are pulled up the Atlantic coast by the currents of the Gulf Stream and end up along the harbors and bays. During our tour, nevertheless, we were more than surprised to see many tropicals, such as various species of damselfish, filefishes, triggerfishes, butterflies, trumpet fishes, as well as blue, gray and French angels. All had been collected in the Long Island, New York area and were on public display at the aquarium!

More fascinating still, another display at the Aquarium contained several lionfish that also had been collected from around pilings at the local marina. These lionfish were in various stages of maturity, and some were so young that their full coloration had not yet developed. There was no doubt at that time that the *Pterois volitans* not only are surviving the colder waters off the northeast coast, but they are also reproducing!

In May 2004, despite having seen the numerous lionfish at Atlantis Marine World, I was glued to my chair in utter amazement at one of the presentations at the combined conferences of Marine Ornamentals/World Aquaculture in Honolulu. Todd Gardner gave a spellbinding talk and showed photos that provided clear proof that the Atlantic Ocean now contains colonies of the Indo-Pacific lionfish *Pterois volitans*!

Continued on page 2
I could not believe my eyes. I swam as fast as I could, calling out to my wife, “Louise! The camera! The camera!” Louise came running. “What is it? French angel? Queen angel? Shark? Stingray?!” I was finally able to catch my breath and blurt out, “LIONFISH!” Louise reacted with total disbelief, “Are you sure?!”

Although Louise is a fish nut “widow,” she has absorbed by osmosis much fish lore. She immediately related to Todd’s presentation two years earlier. She continued expressing her amazement: “You’re positive you saw a lionfish?” She handed me the underwater camera and ran for her snorkeling gear. We took a number of pictures as well as videos in total euphoria of having witnessed this amazing species of fish in the Caribbean! The photos accompanying this article bear witness to what we saw on that day.

The third possible explanation is intentional release. Did the species find itself in the Atlantic because of introduction by curious or bored aquarists? By diving companies wishing to embellish dive sites? By ornamental commercial fish collectors wishing to secure a new collecting area?

For me, the hypothesis of escape from an aquarium has the most credibility. Any partial flow of ocean water through a hatchery or public aquarium could result in fertilized eggs and larvae entering Gulf Stream waters, which are teeming with micro algae, rotifers, and varieties of copepods. (When I have nothing to do poolside, I often take samples of ocean water and look at them through a hand-held microscope. I am surprised to see the multitude of microscopic organisms living in a single drop, readily available to larval fish.)

After the 2006 Nassau trip, I procrastinated completing this article for a year and, yes, took another vacation in the Bahamas! I was anxious to don snorkeling gear once again and, armed with my camera, see if I could locate another lionfish. We were in the water for barely five minutes when we sighted our first lionfish! We snapped many pictures and moved on. No more than 50 feet away, strategically positioned under a small ledge, was another lionfish. I caught this one—very easily, as it did not swim away when I moved the net in front of it—and took some great pictures inside the vinyl net and on the reef after
releasing the fish. The next day, another beach, another snorkeling outing, and two more lionfish sighted!

I was happy to have seen and photographed six lionfish in three different areas, but I was in for another shock. After handing the camera to Louise, I went to collect a few sea biscuits and the beautiful skeletons of sea urchins. As I looked down near the base of the same sea wall, about 20 feet away from the pair of lionfish we had seen earlier, a baby lionfish appeared. It was barely two inches long, and the typical red volitans pigmentation was extremely pale—characteristic of the lighter coloration of many juvenile fish.

I marveled at this golf ball-shaped little fish with its appendages swaying in the current, and then I did a silly thing! If I could simply catch it in my shell-collecting net, I imagined, we could take some great close-ups, as we had done with the large lionfish. I could not have been more wrong. I barely moved my net toward the little fish, and it disappeared with lightning speed into one of the many holes drilled by rock-boring urchins. I had expected the calm, leisurely swimming manner of the larger specimen, but this juvenile probably was still unsure of its venomous defenses.

Several key questions remain unanswered: What ultimate impact will the lionfish “contamination” have on the Atlantic ecosystem? Are there any measures being taken or considered to limit or eradicate the species? How great is the danger that the highly venomous red lionfish poses to human health? And, of course, how large is the Atlantic lionfish population, and how fast is it growing?

To the last question—if my simplistic empirical calculation could be used for these sightings—the lionfish population is reproducing in the Caribbean and has doubled in the last twelve months. An in-depth analysis that documents the species’ true growth rate and the ecosystem effects of lionfish in the Atlantic would be a good project for someone’s graduate thesis.

When I contemplate my first sighting during our 2006 trip to the Bahamas, and the four- to five-inch lionfish that I witnessed—positioned in a natural channel between two limestone rocks that were teeming with mouth-size grunts and damsels—I believe the survival of the Atlantic lionfish is assured. Moreover, with the further evidence of the tiny juvenile this year, it seems that finally, to paraphrase Ian Malcolm in the film Jurassic Park, Nature is finding a way!

References

(1) Talk at Marine Ornamentals held in Honolulu from March 1 to March 4, 2004 by Todd Gardner, entitled “Invasion of the Indo-Pacific Lionfish (Pterois volitans) along the East Coast of North America,” and “Biological invasion of the Indo-Pacific lionfish Pterois volitans along the Atlantic coast of North America.” Paula E. Whitfield1, Todd Gardner2, Stephen P. Vives3, Matthew R. Gilligan4, Walter R. Courtenay Jr.5, G. Carleton Ray6, Jonathan A. Hare1. as published in MEPS Vol. 235. Publication date: June 19, 2002, Print ISSN: 0171-8630; Online ISSN: 1616-1599, Copyright © 2002 InterResearch.

1 – NOAA Beaufort Laboratory, Beaufort, North Carolina
2 – Biology Department, Hofstra University, Hempstead, New York
3 – Department of Biology, Georgia Southern University, Statesboro, Georgia
4 – Marine Science Programs, Savannah State University, Savannah, Georgia
5 – Florida Caribbean Science Center, US Geological Survey, Gainesville, Florida
6 – Department of Environmental Sciences, University of Virginia, Charlottesville, Virginia

(2) Personal communication with Todd Gardner and Charles Delbeek.


Cooperative Hunting Behavior in Lionfish, Captive and in the Wild

During a vacation to Nassau, The Bahamas, in 2004, my wife and I visited Atlantis at Paradise Island, then the largest public aquarium in the world (before the Georgia Aquarium opened). One unique exhibit tank we saw housed as many as two dozen very large lionfish.

Having never seen lionfish in the wild, I believed from the literature that lionfish usually were found as solitary specimens or in pairs, but we were surprised to see that this large congregation of lionfish were living together harmoniously. What’s more, we were told that the lionfish in the exhibit actually cooperate in hunting down the live food introduced into the tank; they corner the specimen as a team, and then each lionfish gets its meal in succession.

Since then, one author relates witnessing this same behavior in the wild, in the Pacific, where about a dozen lionfish were hunting as a pack.
Part 2a: Science Behind Synthetic Sea Salts
From the Labs of Instant Ocean

The first Instant Ocean formula was definitely not a consumer product. It consisted of four parts, with most of the salts in part one. Part two was calcium chloride, and parts three and four were mixtures of trace elements. Segedi and Kelley reported that they were able to maintain invertebrates indefinitely with this formula—something not previously possible.

Throughout the 1960s, Kelly and Segedi continued formulating Instant Ocean, and as early as 1965 they filed patent applications for the formula. Their first patent was granted June 22, 1971 (US Patent 3,585,967). It covered a two-part dry formula; part one contained the basic salts, and part two contained trace elements. A second patent (US Patent 3,623,455) was granted on November 30, 1971, and a third (US Patent 3,886,904) on June 3, 1975.

Over the years, a number of modifications to the Instant Ocean formula have been made. Some of the modifications were changes in the chemical compounds used to formulate Instant Ocean. Other modifications were in the final amounts of the various ions in the dissolved product. The formula for Instant Ocean is proprietary and a trade secret. Only a select few individuals with Instant Ocean know the formula, and they work under non-disclosure agreements to guard against the formula’s being copied. For those reasons, only general references are made to the Instant Ocean formula in this paper.