RESEARCH REPORT: Antibiotic Resistance in Shrimp Farming

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An Unexpected Boat Ride

Over the course of my CLAS summer research project in Ecuador I have grown accustomed to going with the flow and expecting the unexpected. Despite embracing this general philosophy, there are days that still surprise me with their unforeseen twists and turns. June 2nd, 2023 was one of those days.

The day before, I received word that Mr. Rodriggues would be draining one of his shrimp ponds and harvesting the remaining shrimp. I had come to Atacames, Ecuador to better understand environmental contamination caused by shrimp farming, specifically looking at the spread of antibiotic resistance either through the consumption of raw shrimp or through the environmental contamination of water.

Today was supposed to be a great day to collect water samples since the highest concentration of environmental toxins are released during the draining of a shrimp pond in preparation for a new cycle. I arrived on the scene with my water sampling bags, pipettes, antiseptic wipes, and reactive agents, ready to strike when the moment was right!

Suddenly, from behind me I heard someone yell, “Corre, Corre!! (Run, Run!!).” I whipped around to see three men running towards me with nets and buckets. They brushed past me and clambered barefoot down the side of the bank and into the shrimp pond. With water up to their waist they cast their nets into the water and pulled out heaping nets filled with shrimp and fish. In the commotion, I did what any good researcher would do- I started to ask questions.

I knew already that the shrimp farms along Ecuador’s northern coast were often backed by shady financing, that local environmental regulations didn’t seem to apply to them, that they blatantly polluted waterways lined with mangrove forests and that in Atacames they were located next to the most historically disadvantaged and low-income neighborhoods with the least power to advocate for themselves. What I didn’t know is that Mr. Rodrigues, the owner of this particular shrimp farm regularly allowed locals to come fish in the pond at the end of each production cycle. People bustled around me, grabbing more buckets and helping each other open nets as more and more shrimp slapped and jumped into pails.

There was another rumbling sound behind me and Mr. Rodrigues himself drove up in a mud splattered truck. He introduced himself and we chatted about his ideas for improving production yields, reducing chemicals and the increasing global market for shrimp. All of my previous ideas of the reality of shrimp farms on Ecuador's coast turned on its head. I barely had a second to let this sink in, it was time to move on and collect other water samples from other shrimp farms farther down the Atacames River.

Doralis, my field research partner and local resident, had arranged for a local fisherman to guide us down the river. I showed up to the water bank to find a jovial older man with an ore and a very tiny plastic boat with one plank of wood lade across the middle. I held my breath and wobbled on in with Doralis squeezing in after me. We pushed off the bank of the river and I was immediately engulfed by what felt like a nest of mangrove branches. Compared to the open fields of the shrimp ponds, this river channel was dark, cool, and tranquil. Mangrove roots shot into the water from every angle, soaking up

nutrients and chemicals as we glided by. Overhead birds chirped and swooped and on the banks, if you looked closely, you could spot blue crabs here and there gnashing their claws. The water did look green, obviously contaminated, with bits of plastic floating here, a diaper floating over there but, I was stunned by the tranquility that I never knew existed right behind such a chaotic part of town.

We meandered deeper down the canal. Around one bend we spotted a large crane scrapping up one side of the bank, mangling mangrove roots left and right. I was told this crane was hired by Mr. Fernando, another shrimp farm owner, who was looking to widen the river so his shrimp ponds would have better access to the salt water that flowed up the river at high tide. Farther up the river our fisherman guide called out a friendly greeting to someone on the banks of the river, while under a hushed voice I was told that those men worked for another shrimp farm and were throwing out left over shrimp on the banks of the river instead of allowing local people to fish the extra shrimp. The journey continued on like this with new insights at every turn.

I was overcome with the feeling that this was a once in a lifetime experience, not because this would be the first and last time I would dare to sit in such a precarious and tiny boat but because it was clear to me that I was witnessing this river at a critical moment in time. Pollution from the shrimp fisheries was blatant but life still flourished. Yes, the number of fish that the fisherman could catch was decreasing every season but life had not yet been totally extinct from this place. Work could be done and this ecosystem could be restored.

The importance of working towards this goal suddenly sank in. As we paddled out of the mangroves I finally understood how my research could move the needle slightly and work alongside the complex network of realities facing this small coastal community in Ecuador.