

How a Conservationist uses GeneMarker® Software to Protect Birds in Brazil

Brazilian Environmental Law Enforcement authorities believe 90 percent of breeders who raise legal exotic birds sold throughout the country and abroad have some irregularities with their paperwork.

“We see way more chicks reported hatching in captivity than we think these breeders are capable of having,” Conservation Biologist Machado Ferreira said.

And it’s valid to be skeptical. Raising a parrot to maturity through legal means costs breeders a considerable amount more than buying a full-grown poached parrot and forging documents.

“Imagine putting all that money and time into hatching a chick when you can just buy one for \$40 and sell it for \$1,000. And if you get caught, it’s just a \$100 fine,” Ferreira said.

Every year, poachers take an estimated 38 million animals from natural habitats in Brazil to supply the illegal, \$2-billion-a-year wildlife trade. This number includes the illegal pet market but stretches far beyond as well.

However, many in Brazil know the devastating impact poaching has on the country, including Ferreira who runs FREELAND Brasil, a nongovernmental organization employing a mix of education, politics and genetics to increase awareness and curb demand of wildlife trafficking.

There are many species under attack but Ferreira focuses on birds because 82 percent of the live animals seized, received and rescued by authorities, are birds — songbirds and parrots.



Law enforcement seized and released this Parrot and Red-cowled Cardinal. Every year, poachers take an estimated 38 million animals from natural habitats in Brazil. (photographer Juliana Machado Ferreira)

Goal #1: Save the World

Ferreira first got in biology to work with animals and save the world.

“I wanted to be a mix of Jacques Cousteau and Jane Goodall,” she said.

But it was genetics that really drew her to the field. As a graduate student developing her masters in genetics, in 2005, she volunteered at the U.S. Fish & Wildlife Service Forensics Laboratory in Ashland, Oregon and saw how conservation genetics fights poaching first hand. She enjoyed the work so much that she went back every year through 2013 and did her PhD in collaboration with the lab.

“I thought conservation genetics was the coolest thing in the world because it’s a tool—not just research. I really got interested in the kind of information that genetics and molecular biology could bring when used specifically for conservation,” she said.

Proving Paternity

There are two main roles that genetics plays in combatting poaching.

The first is using GeneMarker software by Soft Genetics to identify the genetic markers for legal birds in the market so enforcement agents can perform paternity tests on animals to determine if they were bred in captivity or not. If the bird does not match the parents, it means they were probably poached and the software can be used again to confirm this.

The second role is inferring where the bird is from if it was poached by mapping the genetic diversity within species. The same species of bird can be different genetically if they are isolated in one area. If that's the case, Ferreira can figure out where that bird came from originally, and release it in the right place.

Juliana is involved in all aspects of the identification process, from field work to processing samples in the laboratory. She is currently closing an agreement with the city of Sao Paolo to open a lab to support wildlife enforcement.

Establishing Brazil's First Wildlife Crime Lab

Currently, Ferreira is closing an agreement with the city of Sao Paolo to open a lab to support wildlife enforcement.



The aim is to capture individual DNA profiles of every single animal or species bred in captivity in Brazil for commercial purposes and have that profile become part of the documentation—something incredibly difficult to forge.

Ferreira hopes to raise enough funds to not charge the government for the work for the first three to five years so she can prove the lab's value. She hopes the government would then absorb the lab and become permanent.

For now, the government is supplying her with a facility, power, maintenance, security, and some equipment and biological samples. Ferreira anticipates to be fully operational in two years.



“It took me years to convince the government that a lab like this was needed and that I could run it. So now we just have to set up the lab and start operations. I know it sounds like a lot, but the most difficult thing was getting the government to agree to work with the lab” she said. “We work with the government and not against the government. We give them the tools, the technical knowledge and make everything formalized and professional. That way, it's long lasting and doesn't depend on us.”