

PsittaScene



Twenty Years

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Saving Parrots

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Who's Who? & How We Know Genetics & Conservation

By Adriana Rodríguez-Ferraro

The heat was stifling on that May afternoon. I thumbed through the instruments in my toolbox as my assistant and I sat on the curb and waited. We had driven for hours through dusty arid scrub on bumpy roads to this classic little Venezuelan town. Suddenly we were surrounded. Everyone was talking at once. Most of the group of about 40 people were children who screamed and asked a lot of questions. Immediately I saw that they had what I wanted – parrots. But these were not any parrots; these were Yellow-shouldered Amazon Parrots.

The Yellow-shouldered Amazon (*Amazona barbadensis*), is restricted to dry habitats in an otherwise humid environment. All existing populations are threatened by either habitat destruction or illegal poaching, or the combination of both factors. Populations are isolated from each other by the more humid habitats they do not use. This situation makes them highly susceptible to local extinctions because once a population is extirpated it is very unlikely that wild individuals will re-colonize the area.

I was there to examine whether the remaining populations of the Yellow-shouldered Parrot have any type of contact among them; that is, if individuals are still able to migrate and breed among populations. The answer to this question is essential to the long term protection and management of the species. To answer it

I needed to study the parrots' genes. The movement of individuals from one population to another is very difficult to observe and record in any other way.

Not long ago, genetics and conservation biology were completely separate fields within biology. Nowadays genetics is an important tool in the conservation of endangered species. My study involved genetic analyses of a special type of DNA (mitochondrial DNA), and it was based on the premise that if a population has been isolated for a long time, the individuals living in that area will share the same DNA, which will be different from the DNA of individuals living in other areas. Conversely, if breeding occurs among members of different populations, then a similar DNA composition will be present in those populations.



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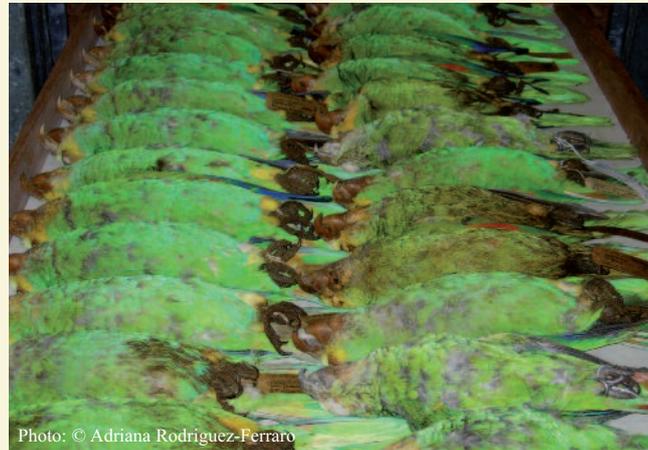


Photo: © Adriana Rodriguez-Ferraro

The Yellow-shouldered Amazon is restricted to 7 existing populations in Venezuela and nearby islands. Inhabiting arid pockets in an otherwise tropical area means populations are isolated from one another. Sampling these populations to determine their relatedness will help researchers determine whether they breed among populations.

DNA had to be extracted from parrot tissues, so my project had two phases: the fun one, in the field where I collected the samples, and the tedious one, in the laboratory, where I extracted the DNA and conducted the analyses. During three breeding seasons (2005-2007) I visited five of the 6 existing populations of the Yellow-shouldered Amazon in northern Venezuela (the other one is in Bonaire, belonging to the Netherlands Antilles); two in the western part of the country (Falcón lowlands and Paraguaná Peninsula), and three in the east (Píritu, Araya Peninsula, Margarita Island). In all these areas I collected blood and two tail feathers. Sam Williams and Rowan Martin (University of Sheffield, UK) kindly sent me blood samples of parrots from Bonaire, and Miguel Lentino (Phelps Ornithological Collection, Venezuela) allowed me to take samples from museum specimens from La Blanquilla. In this case, the sample consisted of a tiny bit of toepad.

The collection of the samples in the field was very interesting and entertaining. From past experience on the Yellow-shouldered Amazon project on Margarita Island I designed my project such that samples would be collected from parrot chicks while they are still in the nest but more than 2 weeks old. To get good and reliable results, I needed

to sample at least 20 individuals from each population and only one chick per nest. Using samples from siblings would introduce a bias since they share the same mitochondrial DNA. So, I had to find at least 20 nests in each area. This design was no problem on Margarita Island where all the nests are known. I simply went to the main breeding area with the project field assistants, they climbed the nest trees quickly, took one chick, passed it to me, I took a small amount of blood from the wing vein and two growing feathers from the tail, and then the chick was put back in the nest. With their skill and experience I collected 10 samples in a single morning.

However, it was not as easy in the other areas where Yellow-shouldered Amazons live. In these areas I contacted local people who were familiar with the natural areas and the parrots. In all cases they helped me find some nests, but we were unable to locate 20 different nests in each area. As I needed as many samples as possible for my study, I tried a different approach. I decided to use adult parrots kept in captivity if the parrot came from nearby areas. Keeping parrots as pets is not illegal in Venezuela, where wildlife law is very ambiguous. Trade is illegal but possession is

not. In each town I went door by door explaining my project and asking people for permission to take blood from their pet parrots. They saw me as the weird outsider woman looking for parrot blood and started asking a whole array of questions, such as “Is my parrot going to be hurt?” to “Are you studying AIDS in parrots?” Some people simply denied my request whereas others were really excited to collaborate in a scientific project. Some sent me, always escorted by a child, to the house of parrot owning relatives or friends. Many times I found myself sitting in the living room or the backyard of a family I just met as they offered me coffee and told me the story of their pet: where it was found, who brought it home and when, its favourite food, and which words it could repeat.

EVEN AFTER PARROT OWNERS agreed to help, I still had to collect the sample. Parrot owners will understand that this was not easy! Most of the parrots kept as pets in Venezuela have had their flight feathers cut on one wing and roam free in and around the house. Sometimes the parrot was on a tree in the backyard and it had to be taken by its “favourite” person into the house. In most cases that person had to be found somewhere in town! In fewer occasions, the parrot was in a cage, whose size ranged from tiny to enormous, each presenting its own difficulties.



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Blood samples for DNA analysis were taken from chicks in wild nests where possible. When that best-case-scenario wasn't feasible, samples were taken from pet birds in local communities and, in some cases, from museum specimens.

Working with adult parrots was difficult because they got stressed very easily, which never happened with chicks. I collected small samples very quickly to limit distress in the parrot and its owner. One of the most enriching experiences of my project was to meet so many very nice people who did everything possible to help even though they did not know me and probably did not understand why I needed parrot's blood!

A VERY SAD PART of all my travels was the trade I witnessed of this species. The fact that most houses have at least one parrot and that our visit to that small town so quickly attracted a crowd of people and their parrots shows that Venezuelan authorities are not taking enough measures to stop the trade. Even though in most of the towns the selling process is very secretive and people were suspicious when I asked about the parrots, it was not difficult to get information about who was selling parrot chicks and where. In Falcón chicks are sold very openly at the sides of the main road from Coro to Maracaibo, so it is evident that local authorities do nothing to stop this threat.

AFTER ALL THE FUN I HAD COLLECTING THE SAMPLES, I spent a year in the laboratory conducting the analyses.

Instead of parrots and interesting people I was surrounded by tiny test tubes, sophisticated machines, and expensive (and even in some cases)

toxic chemicals. The results from the analyses indicated that each population of the Yellow-shouldered Amazon has its own genetic identity, and it is most evident for the ones in Falcón lowlands and the island of Bonaire. This finding confirms the idea that the populations are isolated both geographically and reproductively, even though 3 out of 54 (5.5%) of the genotypes identified in this study were shared among different populations. The parrots of Margarita Island have the lowest genetic diversity of all populations.

THE YELLOW-SHOULDERED AMAZON has experienced population declines across its distributional range in the last century and some populations (i.e., Aruba, Netherland Antilles) have gone extinct. The results derived from this study may be used as baseline information to develop management efforts focused on this

The results confirm that these populations are isolated by geographic barriers and do not interbreed.

species. Any initiative to manage this parrot should strive to maintain the genetic identity of each population. Thus, all the populations must be protected in order to preserve the genetic potential of the species as a whole. Additionally, this information may be used to guide releases of confiscated parrots, translocations, and even reintroductions of individuals in areas where the Yellow-shouldered Amazon is locally extinct.

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