Special Report

The Spix's Macaw Conservation Program

a Non-Extinction Story

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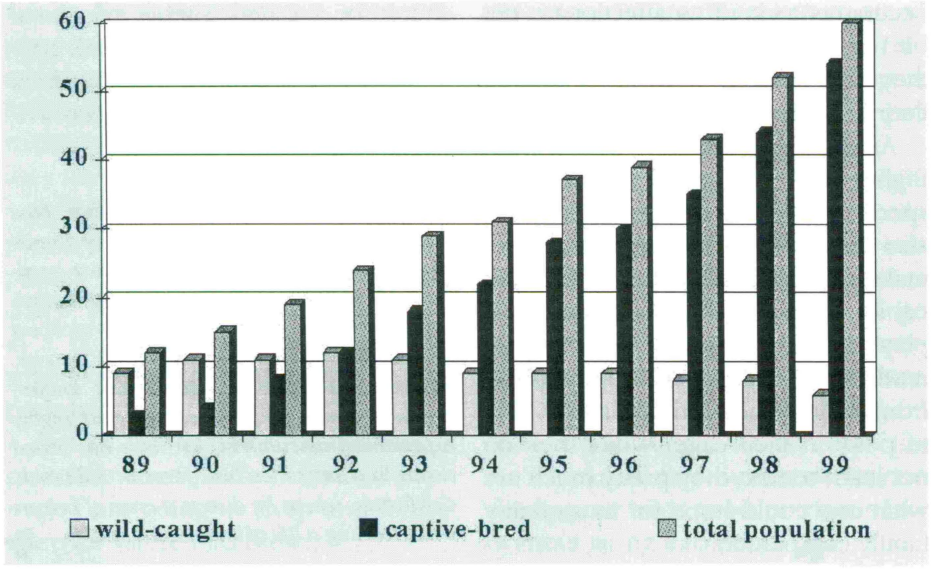
The Spix's Macaw *Cyanopsitta spixii*, one of the world's most critically endangered species, was recently the focus of three days of meetings in Houston, Texas (September 30 – October 2, 1999). Endemic to one small area of Northeastern Brazil, in a habitat known as the "caatinga" (an arid region of flat savanna scrubland interspersed with seasonal creeks and gallery forests), the Spix's Macaw was considered to be extinct in the wild 10 years ago. Nevertheless, this species is now recovering through the concerted efforts of the Brazilian government and an international committee whose members include the aviculturists that hold this endangered species, government officials, conservationists and ornithologists.

With only one known remaining bird in nature, the conservation of this species is dependent on the success of the captive-breeding and field program. The global captive population has grown significantly from a low of 11 known birds to 60 (54 of which are captive-hatched); new holders are participating in the program, the field research program has collected valuable data on the natural history of this species and the ecology of the region, a strong community outreach program is in place, habitat protection and restoration projects are ongoing, and basic-research on psittacine reintroduction techniques has been successfully completed. The progress of the last 10 years has been dramatic.

The meeting, hosted by the Houston Zoo, included a symposium entitled "The Spix's Macaw — Conservation and Management of an Endangered Species," focusing on the last 10 years of field research, community outreach and captive-breeding efforts; the 2nd Workshop on Population Management and Captive Breeding of the Spix's Macaw; and the official meeting of the Permanent Committee for the Recovery of the Spix's Macaw. This meeting highlighted the importance of the collaborative nature of this program, which is proving to be a model of international public/private collaboration in endangered species management.

Spix's Macaw Captive Population 1989-1999



Misleading Headlines

However, recently published articles promote a much different scenario. In London, The Times headline screamed that "Collector's may drive world's rarest parrot to extinction" and the World Parrot Trust's *PsittaScene* August 1999 newsletter article entitled "More on Spix's Macaw" claimed that "the holders of the captive birds simply refuse to cooperate" and included much erroneous information. Readers of these articles cannot be faulted for believing the stories, as these seem to be reliable and knowledgeable sources.

Unfortunately these type of misinformed statements are great for "sound bytes" that attract media attention, but do not contribute to the conservation of the species. This is not the first time that the Spix's Macaw has been used as a political and fundraising tool, a "symbol" of how aviculture contributed to this species' demise.

The Actual Story

If those headlines are false, then what is the actual story? It is a story that involves a great amount of hard work, both in the field and in the captive-breeding efforts. It is also a story of success against great odds, and international collaboration between public and private sector that is unparalleled. How can one make that statement considering the recent reports? The answer is easy — with facts and data.

The Vanishing Spix's Macaw

To truly understand the current situation of the Spix's Macaw conservation effort, one must first go back to the late 1980s when only a handful of ornithologists and aviculturists realized that this species was on the verge of quietly vanishing. In an attempt to draw atten-

Photo by Natasha Schischakin

Spix's Macaw (Cyanopsitta spixii), the female that was reintroduced to the wild.

Photo courtesy of Birds International, Inc.

The future of the Spix's Macaw program — part of the 1999 production at Birds International, Inc. Some of these birds are destined to be reintroduced to the wild.

tion to this situation, a meeting was held by Loro Parque, a major bird park in the Canary Islands, Spain (which had a pair of Spix's Macaws in its collection). Although this attempt was unsuccessful, it laid the groundwork for the future international program.

The status of the Spix's Macaw was at the center of much controversy at the 1988 meeting of the now extinct IUCN-SSC Parrot Specialist Group in Curitiba, Brazil. Although everyone talked about the need to develop a recovery program, there was no chance for a consensus as the participants differed greatly on how to proceed as politics and personalities got in the way of any agreement. Much of the meeting was spent on arguing about the legality of individual captive birds and not on steps to develop an urgently needed recovery effort. Many ornithologists and conservationists were already considering the Spix's Macaw extinct, believing that the few captive birds scattered throughout Brazil and the world were relics of no conservation value. At that time, it was much easier to blame the wildlife trade and aviculture for this species' demise than to formulate a strategy to save it.

Enter IBAMA

It was not until 1989 that the program officially began with the establishment by the Brazilian wildlife authorities of IBAMA (Brazilian Institute for the Environment and Natural Renewable Resources) of a temporary working group to review the status of this species and to make recommendations to the government for its recovery. This was a new approach for the government, which considered this a pioneering group. As a member of this original group, it was clear to us that the situation was beyond critical. The wild population was believed to be extinct and we came up with only 11 confirmed birds worldwide in captivity (although many more were rumored to exist).

The working group's directives from the government were not to decide that the species was extinct, but to develop a last minute management plan to save it. The focus had to be on the few remaining birds in captivity and the first priority was to set up a

breeding program for the existing birds in Brazil. It was not an easy task — as everyone was willing to participate, but no wanted to give up their bird to move it to another location. All were unsexed and a few were held as single specimens. At that time, the Brazilian government and the holders were reluctant to use laparoscopy, considering it too risky.

To solve this problem, the Houston and National Zoos supported the sexing of the Brazilian birds through karyotyping, a technique which was acceptable to all. After obtaining the necessary USFWS, USDA (first time they allowed importation of psittacine samples without quarantine or irradiation) and CITES permissions, I collected blood-feather samples from all known birds in Brazil. Unfortunately there was a short 24 hour window to get them to the laboratory. With help from the U.S. State Department representative who was waiting at the plane's door to help with customs, the samples and I made our connection in Miami and arrived safely at the Avian Genetic Sexing Laboratory of Marc Valentine in Memphis, TN in less than 16 hours! We were finally on our way to starting the program.

Photo by Carlos Yamashita

The last Spix's Macaw in the wild.

A Permanent Committee

Another of the working group's duties was to establish the structure for the Permanent Committee. Everyone recognized that this had to include all international holders, and that it would have to be a group which represented all the stakeholders in the program. The Brazilian government accepted the recommendations and in 1990, established the Permanent Committee for the Recovery of the Spix's Macaw. This was a ground-breaking event, as it brought together many different factions, including Brazilian governmental officials, zoo representatives, national and international holders of the species, ornithologists, and conservationists together with only one single goal – to save this species.

The newly formed Committee continued to focus on emergency measures needed to save this species. The situation was so critical that all ideas and avenues were open to discussion, including previously unthinkable strategies such as amnesty. It was widely believed that many holders kept birds "underground," but were unwilling to join the conservation effort because of the prosecution and confiscation threat. If that were true, there was a very real risk that they would simply disappear without ever being included in the recovery program. In 1990, the Brazilian government passed an amnesty decree to all holders of Spix's Macaws. Although very controversial in some circles (who were not involved in the recovery effort), it meant to show the goodwill of the Brazilian government towards any holders and to encourage full participation in the program. This was a very pragmatic approach to a very serious problem and placed the recovery of the species above politics.

Some individuals continue to believe that current holders involved in the Committee do so because of the amnesty offer, but this is incorrect. All of the Spix's Macaw holders' birds are legal in their respective countries and recognized as legal by the Brazilian government. The birds in Brazil are property of the government and include the birds donated by Loro Parque to Brazil in 1977. All holders have agreed to manage their birds as part of one global population, under the oversight of the Committee (in which they also participate). Unfortunately, in the six years that the amnesty decree was in effect, not one new holder was admitted to the Committee under its conditions. Many of the dozens of supposed illegal birds turned out to be "phantoms," never actually materializing. Despite this, I am always hopeful that we will find new birds that have been "underground."

Found — the Last Wild Spix's

Soon after the first meeting of the Committee in 1990, reports came of the discovery (or re-discovery) of one remaining bird near the small rural town of Curaça in Northeastern Brazil. An ICBP (now BirdLife International) organized expedition had discovered its location with the help of Brazilian ornithologist Carlos Yamashita who had information on the bird's existence. Although they knew the basic area, it was still a difficult task, much like "searching for a needle in a haystack." Luckily, they were successful and found it.

Elation at the discovery soon changed to shock when ICBP chose to inform the world of this discovery through a major press briefing, complete with a detailed map (including the major roads) of the region mapping the bird's exact location. The

Brazilian wildlife authorities had feared that by providing such detailed information of the location of this priceless bird, ICBP actually endangered it. The region was now open not only to new poachers, but also to anyone thinking they could get rich quick, or for some misguided soul to take the "last one" from the wild.

The Brazilian wildlife authorities scrambled to ensure protection, but only to realize that it was nearly impossible to provide enough security due to the large range of this single bird and without local support. Luckily, this last Spix's Macaw was clever enough to escape capture, adding to the myth that it somehow possessed supernatural powers.

Field Program Begins

The re-discovery of this last bird added a new dimension to the conservation program and provided a unique opportunity to learn about the natural history of this species in the wild. It also brought a field research component to the recovery effort that had concentrated on the captive population. Although there were some questions as to the value derived from studying a single specimen, the information collected has proven invaluable. A field biologist has been permanently stationed in the region since 1991, collecting valuable biological data on the last Spix's Macaw, including details about daily movement patterns, seasonal adjustments to drought, food habits, and habitat utilization.

Historical data was also collected, which included information on population numbers, range, poaching, and habitat status. Research concluded that the Spix's Macaw requires a large home range and that it utilized certain habitat islands on a seasonal level for food. Even the observations of the attempted reproductive efforts of the Spix's Macaw with an Illiger's Macaw (*Ara maracana*) provided details of its reproductive behavior patterns.

How Many Were There?

Information from the wild bird has allowed researchers to form a better idea of possible historic population numbers for this species. Some had claimed that the Spix's Macaw population previously numbered in the thousands, but there is no evidence to support such a figure. Spix himself recognized the species' scarcity in 1819 when he collected the type specimen and described the species as "gregarious and rare" in the accompanying notes. This was a juvenile bird, later described as *Cyanopsitta spixii* by Wagler in 1832. It is the only collected museum specimen of this species (all others are derived from captive collections). Such a diminished population was certainly at great risk of extinction, and poaching for the wild bird trade (conducted mostly at the bidding of one infamous middle-man from a nearby town, whom the government now believes has moved on to coordinating the poaching of Lear's Macaws) caused the final catastrophic decline of this species in the wild. Although no one disputes that the final blow came from the illegal trade, the principal cause for the species' decline is believed to be the loss of primary habitat in the region resulting from 500 years of human colonization.

Field researchers believe that in the last century, the Curaça population of Spix's Macaws probably did not number more than 60 individual birds. This figure was extrapolated from habitat data and from interviews of the older people in the community. This is an especially significant number for the recovery effort, as the captive-breeding program has now reached 60 birds, the same as the historical wild population.

Field Biologist & the Cowboys

After arriving in the area, the first field biologist of the project, Marcos Da Ré quickly realized that he could not track the bird alone because of its large home range and daily movements, so he turned to community for help. In particular, the "vaqueiros" or cowboys of the region were enlisted to help keep track of the Spix's. This strategy had the additional benefit in that it involved the local people in the project and gave them first-hand knowledge of how rare and important this species really was. Although many had always noticed the bird, some even obtained watches to track the time that they saw it, becoming additional volunteer "field-team" participants and providing needed manpower and help to the project.

Macaw Enters Local Mythology

As they learned more about the situation of the Spix's Macaw, many simply could not believe that it could be down to only one bird, remembering

Photo by Marcos da Re

Author in front of the rural schoolhouse.

Photo by Natasha Schischakin

Photo by Yara Barros

Before and after photos of the Raul Coelho theater in Curaça where the local community put on a play in the dilapidated old theater in the center of the small town. This play was told from the viewpoint of the last Spix's. It traced with music and action the events of his life, including the loss of the "family" to poachers, his loneliness, the need for a mate, as well as the future which would include the return of his mate. This fairy tale ended with the small fuzzy chick peering happily from the nest cavity and the proud parents watching over it. The story and the community use of the old theater so moved Wolfgang Kiessling of Loro Parque, Spain, that he arranged a grant to help restore the building

the flock was used to roost in the trees along the creek beds of the area. It was a great revelation to find out that indeed that was true. Since then, the last Spix's has become part of the local mythology and his life is often equated to their own experiences. The story they tell is that the Spix's Macaw has faced hard times and endured, just as they have. He lost his family, survived poachers and is still in the wild, a true survivor, just as they are. They have faced drought and famine, lost family members to death and migration to the large cities, but those that are left still hold on to their way of life. Just like the Spix's Macaw holds on to his area and way of life in the wild. They feel that they are both true survivors and are linked by their lives in the "caatinga." I believe there is a great amount of truth in this view.

An often asked question is why is the Spix's Macaw program involved in the community outreach efforts when we should be concentrating on ensuring the safety of the last bird. Shouldn't we be hiring guards and putting up fences? The truth is that no matter what, conservation is always local in scope. It always comes down to very basic issues, such as providing one's family with food, shelter and basic survival. No matter how lofty the global vision, securing the program locally where the species is — even if it is the last bird (as in the case of the Spix's Macaw). We could bring it into captivity and forget about the wild, but then we would be left with a living museum collection. The Committee has chosen to fight this battle and to secure a place for this species, not only in nature, but also within the community.

The poverty of the region, the harshness of the climate, and the difficulty of life, are all-important factors in the daily management of the field project. The support from the locals for the program provides a safety-net for the last Spix's Macaw and to those that are to be reintroduced in the future. The capture of a Spix's Macaw has become unthinkable in the region — a cultural taboo. No barbed-wire fence or armed guard could have achieved this outcome. The community projects resulted from very real needs of the people of the area and included a campaign against hunger, the building of rural schoolhouses, and even the restoration of a century old theater. Certainly not your usual community-based education and outreach programs.

Famine — and Relief

When the field project was initiated, the intent was to work with the local community and get their support for the project. But then the effects of a prolonged drought created a major famine in the region, hitting the locality of the Spix's Macaw range especially hard. It became particularly difficult to maintain the project on the same level. How could we continue protecting a single bird when people were dying? There was only one thing to do, and that was to use the program and the Spix's Macaw to bring relief to those who were suffering the most.

In a campaign coordinated by the workers of the Brasilia offices of IBAMA, the National Park of Brasilia was opened to the public on a weekend, asking for the donation of a kilogram of non-perishable food for the entrance fee. This volunteer effort by government employees raised seven tons of basic food items in the name of the Spix's Macaw. It was transported to Curaça, by the trucking company of one of the Brazilian Spix's Macaw holders, Mauricio dos Santos. The food was distributed through the rural school teachers network, as well as the city public schools.

Now many people of the region not only fully support the conservation program, but also credit the Spix's Macaw with helping them and their families survive the famine. Seeing the effects and devastation of this drought brought a very realistic and somber attitude to the program, providing a different perspective on the intricacies of conservation.

Education — a 50-50 Program

Another issue that affected almost every family in the rural area was the lack of education opportunities for their children. This was identified as a major problem by biologist Marcos Da Ré soon after beginning the field project. Education was valued and children made a great effort to study, walking long distances to designated houses of a "rural schoolteacher" (local women who had been trained by education extension agents in providing an education up to fourth grade to local children). Classes were held in tiny rooms in the small shacks or outside in the yards. Although they tried, these schoolteachers had nothing to help the students. Books were almost non-existent, notebooks, pencils and supplies were shared.

Da Ré came up with a solution through a 50-50 partnership between the project and the community. The Spix's project provided the materials and the locals provided the labor in the construction of local one-room schoolhouses that could serve the local children and as community centers. That is how a cooperative program called the "Rural Schoolhouse Program" was started and the first Ararinha Azul (Spix's Macaw) Schoolhouse was built.

The Houston Zoo and the Santa Ana Zoo are contributing to this pioneering project. It is hoped that by investing in basic education, the children of the community grow up to be literate adults who can understand how to manage and conserve the scarce resources of the region, including the species of the area. This investment shows that the program is a member and partner of the community, not an adversary.

Theatrics

The restoration of the theater was quite extraordinary, but even this project became controversial in some circles. How does the restoration of an almost century old theater in a nearly forgotten small town in Northeastern Brazil affect conservation?

Considerably. It started through a series of coincidences and luck. After a Spix's Macaw Committee meeting in Brazil, many of the participants traveled to Curaça where the local community put on a play in a dilapidated old theater in the center of the small town. This play was told from the viewpoint of the last Spix's. It traced with music and action the events of his life, including the loss of the "family" to poachers, his loneliness, the need for a mate (therefore the pairing with the Illiger's female), as well as the future which would include the return of his mate. This fairy tale ended with the small fuzzy chick peering happily from the nest cavity and the proud parents watching over it. It was a story of hope and of success in adversity — a powerful and emotional message to all attending.

Photo by Natasha Schischakin

A group photo of the students of the rural schoolhouse and visiting Spix's Macaw Committee members.

The effort and community spirit so impressed everyone, that Wolfgang Kiessling of Loro Parque, Spain, arranged a grant from the Loro Parque Foundation for the restoration of this theater that was matched by the community in both funds and labor. Finally, in 1996, the renovation was completed in time for the re-inauguration of the "Teatro Raul Coelho" and the celebration of its 100th anniversary. The theater has become the heart of this small town and is central to many events and celebrations, reminding them of the value of preserving and ensuring the security of the Spix's Macaw and the project.

How to Establish a Wild Population?

The establishment of a wild population has always been one of the goals of the recovery program for the Spix's Macaw. However, before initiating a reintroduction for such a critically endangered species, four important goals had to be completed.

1. The captive population had to reach a stable, self-sustaining reproductive level from a genetic and demographic standpoint to absorb the removal of potential breeders.

2. There had to be a safe and viable environment to return this species to the wild.

3. There had to be a local infrastructure capable of supporting the reintroduction and monitoring of the released birds.

4. The reintroduction techniques had to be developed which were appropriate to this arid region.

Throughout the program, there have been many calls (and even demands) from various groups for the immediate reintroduction of captive birds to the wild, not understanding that such a simplistic approach could in fact *threaten* the species in the rush to save it. These demands were often made without much comprehension of the difficulties involved in reintro-

duction programs for psittacines or even any idea of the status of the captive population and the availability of birds for release.

Let the Last One Fly Free

In late 1992, after almost two years of field research, the Committee sponsored a Population and Habitat Viability Analysis (PHVA) Workshop, facilitated by the IUCN-SSC Captive Breeding Specialist Group Chairman Dr. Ulysses Seal. It was at this meeting that it was decided that this last surviving bird would not be captured for the breeding program as it was more important to the conservation effort in the wild. The field data had clearly shown that its survival skills and knowledge of the wild made this last bird an important potential "teacher" for future reintroduced Spix's Macaws.

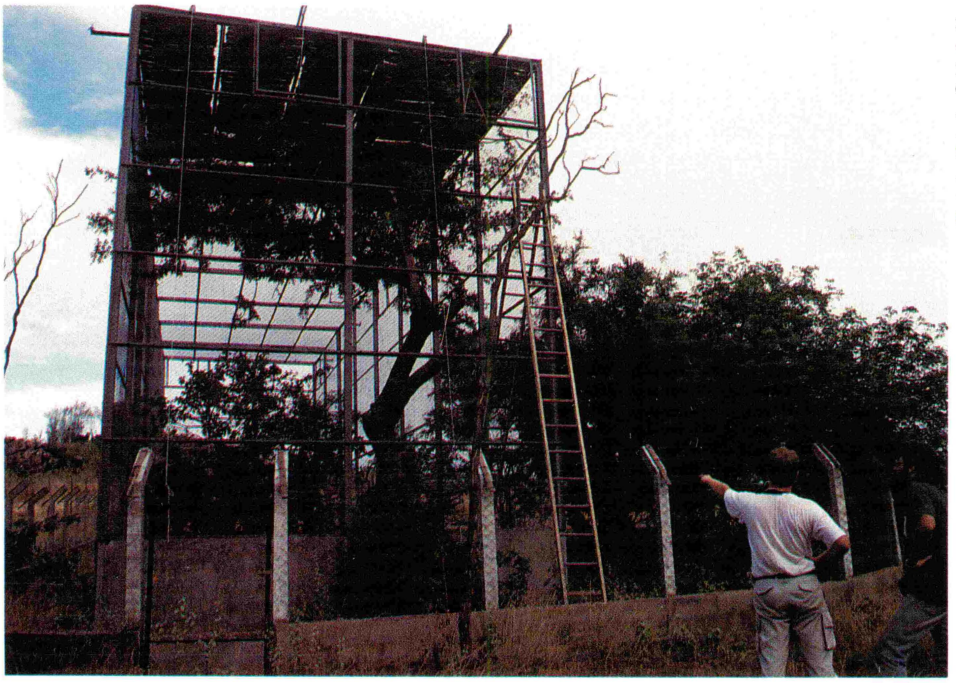


Photo by Natasha Schischakin

The Spix's Macaw re-introduction facility was built on site, but still logistically difficult as trucks had to bring in the equipment. It was built around a tree and has a smaller holding facility to manage the birds.

And Find a Mate

After the decision to leave the wild bird in nature was made, the reintroduction of another bird to join the last one was be considered, so the captive population was closely examined for potential reintroduction candidates. Of all the captive birds, only one fit a very specific profile, which made her the best (and only) candidate for reintroduction at that time. This was a bird that was known to have been the last one taken into captivity, as an adult, from the wild. According to information collected from local poachers, she was taken while in the nest on eggs (which were broken during capture). She was held at the Chaparral facility in Recife, Brazil, and paired with a male transferred from the São Paulo Zoo. Although compatible, this pair had shown little breeding activity. A decision was made to reintroduce this individual bird to the region as she likely had the most experience and survival skills. (After the release, a captive-bred female from Birds International, Inc. in the Philippines was later transferred to Brazil and paired with this remaining male.)

But...is it REALLY a Male?

Although we had identified the female which would be released to the wild, we still had to deal with another serious question — the sex of the last bird. Because of its behavior, the field biologists believed that it was a male. On the other hand, as anyone who works with psittacines well knows, same sex pairings are not uncommon and behavior is not always a good indicator. To sex the last bird with available techniques meant that we had to capture a very wary bird that had outwitted the best poachers. Out of concern that we could endanger its life through the stress of capture, it was decided that a method would have to be found that did not include capture. A potential technique still in the investigative stages was the use of DNA, in this case, from molted feathers.

Dr. Griffiths, of Oxford University, in the United Kingdom took on this problem, and finally perfected this sexing technique. Feathers were collected from known roosting sites of the wild Spix's Macaw and sent to the UK for testing. In 1995, after nearly two years of research, and right before the scheduled transfer of the female to the region, we were given an answer — the wild bird was definitely a male! (Note: Dr. Griffiths later published his findings in the distinguished scientific journal *Nature*. This DNA sexing technology, originally developed to sex the last Spix's Macaw in the wild is now routinely used in aviculture.)

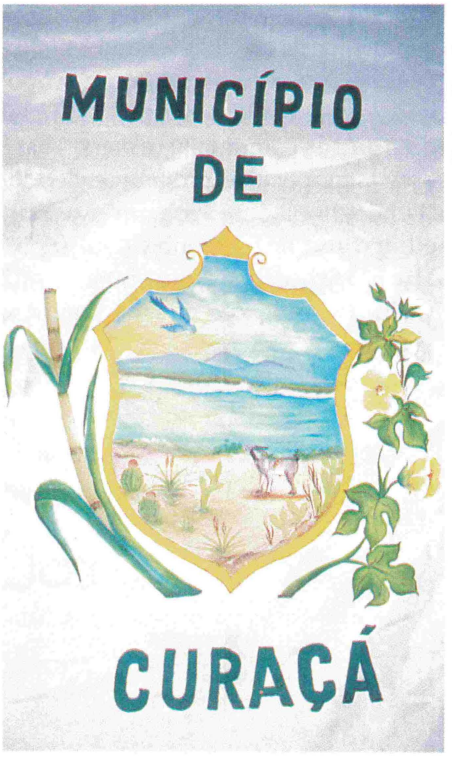


Photo by Yara Barros

The new flag of the Municipality of Curaca, which includes what is important to the community -- the Spix's Macaw and the goat.

Hope and Disappointment

The wild caught adult female was transferred to the newly built reintroduction facility with the knowledge that she would have the opportunity to pair with a male. She then spent over seven months in the reintroduction facility adapting to the new environment, diet, and long flights. The field researchers were amazed at her adeptness in changing to the local food items (adeptly opening nuts on the first try), as well as her apparent innate ability to recognize predators. It was felt that the right choice had been made and that she had adapted better than anyone had hoped or anticipated.

After her release, the field team was able to monitor her for two months. She had adapted extremely well, spending the last month flying and easily keeping up with the male. They appeared very compatible with much interaction and allopreening behavior. It seemed that she had beaten the odds and survived in the wild. By now, the story of the last wild bird and the reintroduced female had taken on fairy tale dimensions and seemed to be following the plot of the play presented years before in the theater. But this real story did not have the expected happy ending with a fuzzy blue chick peering from the nest.

Overnight, the field team lost track of her. Her sudden disappearance came as a shock not only to the field team, but to the local, national, and international communities. Only in the last few months, has the field staff been able to uncover credible evidence that she died through a collision with one of the high power lines that crosses the reintroduction area.

The Reintroduction Strategy

Although the release of this Spix's Macaw female did not have the hoped for results, it is considered an important step in the reintroduction program. Much was learned from the experience, which has benefited future reintroduction efforts. A complex reintroduction infrastructure and holding facility has been built and a field base established because of this first effort. The restoration strategy for this species to the wild has never been based on the idea of a single pair of reproducing birds. It was just a first step in a long-term strategy of periodic supplementation of the wild population by reintroduced captive-bred birds. (A strategy defined in 1992 at the CBSG Population and Habitat Viability Analysis Workshop.)

Since that initial reintroduction attempt, two major experiments in psittacine reintroduction have been conducted by the field staff. The first critically important project was designed to develop the necessary protocols for eventual reintroduction of captive-reared Spix's Macaws. To do this, captive-hatched Illiger's Macaws (both hand- and parent-reared) were chosen from Loro Parque in Spain. These were quarantined and eventually transferred to the reintroduction facility where they were fitted with radio-collars and allowed to adapt to the region. Numerous problems had to be faced, including the unexpected destruction of the radio-collars by the birds and the failure of the radios to work.

This experience resulted in changes to the reintroduction protocols and the successful utilization of tail-mounted transmitters. Finally, in December of 1998 and early January 1999, a total of nine birds were released to the wild. Of these, one died within a week and another disappeared, but seven of the reintroduced birds have adapted well to the wild. This is considered an excellent survival rate for reintroduced captive-bred birds, which we believe is the result of the long adaptation period and acclimatization period. A pair formed by the reintroduced Illiger's Macaws has now occupied a nest hole and maybe will breed this season.

The second project conducted by the field team involved the application of the commonly used avicultural technique of fostering chicks. As it was apparent that the Spix's Macaw male and Illiger's Macaw female were a bonded pair which attempted to nest each season, this behavior could be used in the recovery program. If Spix's eggs were available, could they not be raised by the mixed-species pair? Of course, this meant that a breeding pair had to be perfectly synchronized with the wild pair... but that's another problem we are working on. Before even risking such a procedure, the team had to determine whether the pair could be successful as parents. To test this, Field Program Coordinator Yara Barros closely monitored the Spix's nest to determine egg laying and brooding, replacing their eggs with wooden ones. As the "hatching" dates approached, she changed out the eggs for newly hatched Illiger's Macaw chicks from a nearby Illiger's nest, imitating a "natural" hatching sequence. The Spix's and Illiger's Macaw pair successfully fledged the chicks, showing us that the pair could be used for the actual fostering of Spix's Macaws to the wild. Of course, a concern has been that they would then look to Illiger's as mates, but it appears that the Illiger's chicks have taken on many of the Spix's characteristics, including behavior and vocalizations. Behavior data on these Illiger's should give us additional information of the effects of fostering on the chicks.

Captive Breeding a Key

The field research, community outreach and reintroduction program development has been successful, but everyone is keenly aware that the eventual reestablishment of Spix's Macaws to the wild depends on the success of the captive breeding program. Without available birds for reintroduction, it will be impossible to consider the establishment of a wild population. The Spix's Macaw captive breeding program is one of the few species which is managed as a single global population. In the last decade, the captive breeding and management program has made tremendous progress in increasing the population and ensuring the best possible genetic and demographic profile. In 1993, to better manage the growing population, the Committee established the Working Group on Captive Breeding, which I coordinate.

International Collaboration and Trust

In the beginning of the program, there weren't many options for setting up pairs. As the population increased and a few older birds died, it became important to move birds between facilities for genetic and demographic purposes. In the last 10 years, we have

transferred birds between the facilities of Birds International, Inc. in the Philippines to Brazil and Switzerland, Swiss birds have been transferred to the Philippines, a bird from Vogelpark Walsrode in Germany was transferred to Brazil and later the Philippines, a total of three birds have been transferred from the Philippines to Brazil and two birds have been transferred from the São Paulo Zoo in Brazil to the Loro Parque facilities in Spain. This last transfer was an important step in the program in which the Brazilian government recognized the global nature of this conservation effort and agreed to send two Brazilian held birds to an international facility for breeding purposes. To achieve this level of exchanges for breeding purposes takes a great degree of collaboration and trust, and could not have been accomplished without the support of the breeders who hold the future of the Spix's Macaw in their collections.

In developing the population management strategies for this species, the Working Group on Captive Breeding has held two technical workshops which bring together everyone involved in the captive-breeding program, as well as advisors, to periodically evaluate the program strategies, breeding status and management plan. Although the population is managed closely, this type of in-depth population masterplan evaluation is necessary as the population increases and young birds approach breeding age. The 1st Workshop on Captive Breeding of the Spix's Macaw was held in 1994, in conjunction with the CITES Conference in Fort Lauderdale, FL, and hosted by the CITES Secretariat. It was successful in defining the genetic and demographic management strategy for this species and included major transfers and new pairings of birds.

What Next?

The 2nd Workshop on Captive Breeding and Population Management of the Spix's Macaw, recently held in Houston, focused on the development of a collaboration and trust through a comprehensive evaluation of each individual bird in the population. The captive population now stands at 60 captive birds, of which 54 are captive-bred. This is a significant figure and is expected to increase significantly as the new young pairs come into reproduction. The need to transfer birds to new facilities was also addressed as an important step in the growth of the program to ensure against catastrophes at any single facility that could affect the population. This is an ongoing effort, with the in-country transfer of birds between holders in Switzerland already implemented. As the population steadily increases, the utilization of captive-bred birds for the reintroduction program has become an option for the first time in the recovery program. Recommendations for new pairings, transfers, and research were made (including the identification of captive-bred birds destined for the reintroduction program).

The Houston Zoo workshop exemplified the level of cooperation among the participants, which included all Committee members, collaborators and invited observers. Participants included myself as the Committee's Coordinator of the Spix's Macaw Working Group on Captive Breeding, Antonio de Dios (Birds International, Inc., Philippines); Wolfgang Kiessling (Loro Parque, Spain); Luis Sanfilippo (São Paulo Zoo, Brazil); Mauricio dos Santos (Criadouro Chaparral, Brazil); Roland Messer (Swiss Breeders, Switzerland); Dr. Iolita Bampi (IBAMA, Brazil); Carlos Yamashita (IBAMA, Brazil); Pedro Scherer Neto (Brazilian Ornithological Society, Brazil); Monica Koch (CEMAVE, Brazil); Yara Barros (Spix's Macaw Field Program Coordinator); Steffen Patzwhal (Parc Paradisio, Belgium); Yves de Soye (Loro Parque Foundation, Spain); Dr. Friedrich Janeczek (Birds International, Inc., European Representative); Dr. Susan Clubb (Loro Parque and AZA Macaw Group Veterinary Advisor); Robert J. Berry (AFA, USA); Dr. Richard Porter (IAS, USA); Lee Schoen (Houston Zoo, USA); Dr. Branson Ritchie (University of Georgia, USA); Dr. Darrel Styles (AFA Conservation Committee and AAV Aviculture Committee) and Laurie Bingaman-Lackey (AZA Small Population Management Advisory Group).

The meeting of the Permanent Committee for the Recovery of the Spix's Macaw was successful in determining the next steps in the long-term management plan for this species, both in captivity and the wild. Some of the decisions made included approval of land acquisition for the establishment of a permanent research base in the region, increasing the rural schoolhouse and community programs, identification of captive-bred birds to the reintroduction project, approval of new holders and captive-breeding facilities, fund-raising, and many other projects.

Although this species is still a long way from eventual recovery, it is the first time that the captive population is stable enough for an active reintroduction program of Spix's Macaws.

Conclusion

As I finish this "non-extinction" report of the Spix's Macaw, I hope that it will have provided the readers with not only an overview of this conservation effort, but also of the issues, problems and even conflicts involved in its conservation. Many people and organizations have played an important role in the conservation program for this species. However, we could have never come this far without the full support of the Brazilian wildlife authorities of IBAMA, and in particular the work and leadership of Dr. Iolita Bampi (Chief of the Wildlife Department - DEVIS). Certainly no one can claim that this species is yet safe from extinction, but when one considers its status only a short 10 years ago, one cannot help but feel a deep sense of optimism for its future.

On my desk lies a small blue puppet with fuzzy down that was once the star of a play telling the fairy tale story of the Spix's Macaw. It is a reminder of an event in a dilapidated old theater, in a small rural town, and of a group of children that had been in the play. They had run up to me afterwards and given me the puppet as a reminder to help them get a real Spix's chick... Maybe we are not too far off from fulfilling that wish.

Program Supporters

Support for the Spix's Macaw recovery program has been provided by the following organizations:

Brazilian Institute for the Environment and Natural Renewable Resources (IBAMA); Fundacion Loro Parque; Ó Boticario Foundation; ASHOKA Foundation; Herbert Levy Institute; Birds International, Inc.; WWF-Brazil; BirdLife International; Houston Zoo; Grupo Relampago; AZA Brazil Conservation Action Partnership; The Moulton School; Fundação Parque Zoologico de São Paulo; Santa Ana Zoo; Central Hydroelectric Company of São Francisco; and many individuals involved in the program.

In the United States, the Committee for the Recovery of the Spix's Macaw is working with the American Federation of Aviculture (AFA); International Aviculturists Society (IAS); American Zoo and Aquarium (AZA) Brazil Conservation Action Partnership; and Houston Zoological Society to explore fundraising avenues to directly support projects, including field research, land acquisition, the rural schoolhouse program, reintroduction, and other priority programs.

Internationally, the Loro Parque Foundation of Spain has been the primary funding group of the field program and has played an essential role in raising funds for the conservation of this species. If you are in interested in supporting the Spix's Macaw program, please contact one of these groups for information.

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Parrotlets

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Tiny, terrific and talented, parrotlets are quickly becoming very popular among people who want all the personality of a big parrot in a small, quiet bird. Parrotlets are adorable, intelligent, playful, sexually dimorphic, and make wonderful pets when handfed. They can learn to talk, need little space, are easy to breed and care for, and are incapable of screaming.

Relatively unknown until a few years ago, parrotlets are rapidly becoming one of the most popular parrots in aviculture. They are also one of the world's smallest species and are often confused with lovebirds. Being true parrots, however, they are most closely related to the large Amazons. There are actually three different genera of parrotlets: *Touit*, *Nannopsittaca* and *Forpus*, all of which are found in either Mexico or South and Central America. Parrotlets from the genus *Forpus* are the only ones bred in the United States.

These little parrots are various shades of green with patches of yellow, gray, and blue which identify the species. Identification of the male of a species is made upon the particular shade and location of blue he possesses. The females are more difficult to identify so close attention must be paid to small details such as subtle changes in the shades as well as the distribution of yellow and green feathers.

Parrotlets kept as single birds make the best pets. Ideally, the young parrotlet should be placed with its new owner at six to 10 weeks of age. They are weaned and their bonding instinct is strongest at this time. However, this does not mean that older birds do not make wonderful pets — they can. If the parrotlet is placed in a loving and caring home, it will quickly become a member of the family. Females more often than males can become "one-person" birds. However, the younger the bird is adopted and the more people handle it, the more likely it is to tolerate all people. Since many species of parrotlets are rare, only Pacific, Green-rumped, and Spectacled Parrotlets ought to be sold as pets.

Pet parrotlets are usually bundles of energy, spending hours swinging, climbing and playing with lots of toys which their cage should accommodate. Ropes, ladders, leather chew toys, bells, beads and Olympic rings which are particular favorites. They are amazing acrobats and often play with several toys at once. They can also be taught to use a playpen but they must be monitored as they will often come looking for their person. Being intelligent and fearless, their natural curiosity can get them into trouble if they are not supervised

Parrotlets, particularly hens, should be at least a year old before they are allowed to breed or they can become egg bound and die. Males who are too young often do not provide enough food for the hen and the babies which are then abandoned or destroyed. Young pairs can be kept with one another until they go through their first molt, then they should be separated until they are at least 11 months old. It is not uncommon to have handfed