REVISITING *RIO* STAR PRESLEY:

Is there hope for the Spix's Macaw?

By Emily Lott Robinson

Like many parrot lovers, I was both delighted and distressed by the movie Rio, released in 2011 by Twentieth Century Fox. Driven to learn more about Presley, the real Spix's Macaw on whose story Rio is based, I decided to try to find out what had happened to him since his miraculous discovery ten years ago. Was he still alive? Was he ever paired with a mate? Had he successfully fathered any chicks? World Parrot Trust Director Dr. James Gilardi, who was personally involved in Presley's discovery, graciously agreed to speak with me and also put me in touch with Presley's current caretakers, Bill and Linda Wittkoff of the Lymington Foundation in Brazil. I also spoke with Ryan Watson, studbook keeper for the Spix's Macaw and manager of the Brazil Project for the Al-Wabra Wildlife Preservation, about the current challenges facing both Presley and the Spix's Macaw.

The 2011 release of the animated film Rio brought much-needed attention to the plight of endangered species everywhere. The movie tells the story of Blu and Jewel, two Spix's Macaws, purportedly the last male and female representatives of their species. In the film, an alert ornithologist discovers Blu living as a pet in an American home, and persuades his human companion to allow the bird to travel to Brazil to meet Jewel, the last surviving female, in an attempt to rescue their species from certain extinction.

This much of Rio is based on a true story. In 1990 when international efforts began to rescue the Spix's Macaw from the brink of extinction, only eighteen parrots available for breeding purposes could be found. Because these birds had all been poached from a near-decimated wild population in Brazil, they were scattered across the globe, geographically divided and isolated in even smaller populations. Most were genetically related, and nearly all were in the hands of private individuals who had no obligation to participate in a breeding program.

Tragically, as the century rolled over in 2000, the last known Spix's Macaw living in the wild disappeared. So it was like a miracle when, in 2002, avian veterinarian Mischelle Muck of Colorado was contacted to examine an ailing blue Macaw named Presley and recognized it as a Spix's. An inspiring subject for a Hollywood movie indeed.

A few glimmers of hope have emerged in recent years, but they are not wholly reassuring. Thanks to better research on breeding and breeding methods, the number of Spix's has been steadily increasing. The vast majority of the existing birds belong to the Sheikh Saoud bin Mohammed bin Ali al-Thani at Al-Wabra, his privately owned facility in Qatar for breeding and protecting exotic and endangered animals. The Sheikh recently bought a crucial piece of land in Curaça, Brazil, along Melância Creek, the last known location for a wild Spix's population, very likely including the very same nesting trees where Presley was hatched. In addition to this 2380-hectare parcel, 400 adjoining hectares were acquired by the Lymington Foundation with donations from Parrots International and the Association for Conservation of Threatened Parrots in Germany. A breeding facility with a hatchery, nursery and aviary will also be established, with the ultimate goal of reintroducing the Spix's Macaw to the wild.

Restoring a wild population will be a risky venture however. In 1995 a female Spix's was released as an intended mate for the sole surviving wild individual; however, even with the advantage of previous experience living in the wild, she was found dead only three months later after flying into power lines. Because the last wild male himself disappeared in 2000, the individuals slated for release in the future have never lived in the wild and will have no wild partners to guide them. They will have to learn for themselves how to forage for food, evade predators and avoid poachers. In addition, the birds' fragile natural habitat will have to be carefully restored and then defended from the constant pressure of human encroachment. As Tony Juniper points out in his poignant book, "Spix's Macaw: The Race to Save the World's Rarest Bird," "Returning Spix's Macaws to the wild will depend on the wild still being there." There are also those who believe the money to acquire the land was ill spent, given the modest increase in population numbers, and that the money could be put to better use.

There are currently 79 Spix's Macaws in existence and under management of the studbook (another 10-12 are held by interests who refuse to participate in the international breeding effort). Unfortunately the sheer increase in numbers does not tell the whole story. Efforts to expand the Spix's population face particularly daunting challenges. Because of the scattered population, breeding efforts require human action and cooperation, but persuading governments and private owners to work together for the good of the species has proved problematic and unreliable. Further, only a handful of wild-caught, more genetically diverse birds survive, most of whom are older and are unfit for breeding.

The fact that most of the Spix's Macaws alive today are descended from a mere handful of individuals is a matter of grave concern. As a result of this severe genetic bottleneck, the population suffers sorely from inbreeding, which preserves harmful genes and spreads them throughout the population. Eggs from related parents only rarely produce chicks; for example, only 10% of 280 eggs laid at Al-Wabra over a 6-year span produced viable offspring, with an even more worrisome 2% viability rate in second-generation eggs. Genetic uniformity also causes gender imbalance; chicks hatched in recent years are more likely to be female, with predictable consequences for breeding efforts. It is also much more difficult to produce chicks that can themselves produce offspring; many of the current 79 are infertile and cannot contribute to the resuscitation of their species. Fertile males are especially scarce. And like any inbred population, the species faces a heightened risk of decimation from disease. Contrary to the hopeful ending presented in Rio, the ultimate survival of the Spix's Macaw is by no means a sure thing.

The accidental discovery ten years ago of Presley, a single, wild-caught male was a beacon of light in the Spix's darkest hour. Mischelle Muck was contacted to examine Presley after he lost his companion of many years, an Amazon parrot. Muck found Presley suffering ill health from a poor diet and lack of exercise, as well as depression after losing his Amazon friend. While Muck nursed Presley back to health, Dr. James Gilardi and the World Parrot Trust bargained with the Fish & Wildlife Service, arranging immunity from prosecution for the owner in return for her surrender of the rare bird. The WPT then worked with the Brazilian government for months to arrange Presley's safe return. "In many ways, his return to Brazil was arguably the first time that any group has made a decision regarding any of these Spix's which put the species' interest first," says Gilardi. Before flying Presley back to his native country, the WPT ensured that tissue samples were taken and stored with the San Diego Zoo's "Frozen Zoo" collection where they will be available if and when cloning techniques become possible. Hopes were high. Said Gilardi ten years ago, "In 15 years, there is every likelihood we will be talking about Presley having reproduced . . . in some way, he will contribute to the continuation of his species."

Rio ends on a happily-ever-after note as Blu and Jewel dance away to a jungle beat, safe in a protected forest setting with their burgeoning family. Presley's story also earned a happy ending for Twentieth Century Fox, grossing nearly half a billion dollars in ticket sales worldwide. Sadly, his real story is very different.

Once repatriated, Presley became the property of the Brazilian government, with decisions regarding his life and breeding relegated to the government's wildlife agency. He was sent to live with caretakers Bill and Linda Wittkoff, the founders and proprietors of the Lymington Foundation, a conservation and breeding facility near São Paulo. This couple watched over Presley's health and oversaw the first—and only—breeding effort. In 2006, a Spix's named Flor, a genetically valuable female, and one of only two surviving Spix's ever hatched in captivity in Brazil, was brought in as a mate for Presley. Linda Wittkoff reports that the pair lived contentedly together for one breeding season, during which they produced two clutches and thirteen eggs. She says that Presley was a good mate, watching over Flor and defending their nest. Tragically, the eggs were infertile and none of them hatched. Flor was eventually separated from Presley and removed to be mated with a proven fertile male Spix's from the population in Germany. This pair failed to produce eggs, and she was later sent to the facility at Loro Parque in Spain, where she has yet to successfully produce chicks. It therefore remains an open question as to whether Presley himself is capable of producing offspring, as he has never been paired with a proven female. There have been no other attempts to mate Presley since.

Presley is now an older bird of at least 27 years. Poached from his native forest home early in life, he spent over twenty years as a household pet with an unfit diet and little or no exercise. Wittkoff reports that he currently has some liver problems and cannot fly; however, he is still strong enough to hang on one foot from the top of his cage and flap his wings. Following Flor's departure, the Wittkoffs took in a wounded Golden Conure who has become Presley's current companion. Wittkoff was happy to know that someone, at least, was concerned with his present fate. "Presley has been somewhat forgotten, I'm afraid," she told me.

When I spoke with studbook keeper Ryan Watson, he assured me that Presley was not forgotten, but also believes that his health conditions make it extremely unlikely that he can mate on his own. Sadly this probably has not always been the case, but due to the fractured distribution of the Spix's population, they must now rely on human intervention in order to reproduce and this has not worked in Presley's favor. One reason or another has prevented Presley from being paired as often as he should—and now time, human cooperation, and luck will determine whether his genetic heritage is passed on to future generations.

Improvements in technology will be crucial. If cloning procedures are ever perfected, the DNA samples collected from Presley before his return to Brazil could theoretically be replicated and used for breeding long after his death. Research on cloning is currently being conducted by commercial interests and may prove useful in conservation work as well. However as of today, that possibility remains purely speculative.

An alternative would be to use artificial insemination. Two varieties of A.I. are in use among parrots, but so far have not proved successful in Spix's Macaws. The first involves cryopreservation of semen from the male for later use even beyond the death of the individual. This procedure is currently being researched at the University of Geissen and elsewhere, but is still in the developmental stages and probably will not be available in the immediate future.

The second A.I. method uses semen manually collected from a male to fertilize a female on-site. This technique requires precision timing and compliant behavior on the part of the parents, which can be difficult to achieve during nesting time. It has been used successfully in other large parrots, but has not yet succeeded with Spix's Macaws, due to their wild nature and consequently higher stress levels. However, according to Watson, research done over the last two years has been promising and may be available in the very near future. He added that once he new breeding facility in Brazil is complete (tentatively projected for mid-2013), it is possible Presley could undergo artificial insemination there.

What is certain is that the fate of the Spix's Macaw lies entirely in human hands. Cooperation amongst the owners of the existing birds with breeding efforts is necessary but not sufficient. A meeting of Spix's holders has been tentatively scheduled for June of this year, at which an attempt will be made to reach agreement on specific breeding pairings. According to Watson, Presley will be included on the list for discussion, although the current studbook from 2011 lists him as "retired" and his DNA profile was excluded from last year's breeding recommendations.

If there is any hope left for capitalizing on the miracle of Presley's discovery—it must be done soon. Perhaps his age should be viewed not so much as a deterrent but as an incitement to take action quickly, risks though there may be. Considerations of difficulty and uncertainty might carry more weight were the Spix's situation not so dire. With only a handful of fertile birds in existence, and only 2% of second generation eggs leading to offspring, every chick is important and every individual who is not proven infertile is crucial.

Presley has already waited ten years, and may have even longer to wait as the new facilities are built and the holders reach agreement on his fate.

Many believe that we have a moral obligation to this species which human ignorance and greed drove nearly to extinction. Whatever fate awaits the Spix's Macaw, we must be able to look back and say, without regrets: we did everything we could.

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