Review of Medical Cases in Alaskan Bald Eagles (*Haliaeetus leucocephalus*)

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Session #400

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Abstract: Four raptor rehabilitation centers were surveyed in Alaska for bald eagle admission details (injury cause and presenting signs) for the years 1993 and 2003. Statistics were generated and analyzed spatially and temporally. Most admissions sustained injuries that were traumatic in nature and/or were a direct result of human interaction. Based on the statistics, recommendations are offered regarding areas to focus prevention efforts and medical research. Recommendations are also made to improve this survey technique to create a resource for wildlife professionals and rehabilitators.

Introduction

The purpose of this review is to summarize data related to injuries in wild Alaska bald eagles admitted to rehabilitation centers. Objectives include identifying major causes of injury, major patient presentations, and to correlate these temporally and spatially. From these correlations, regions of occurrence for modalities of injuries could be identified where increased effort should be directed regarding prevention programs. From statistics of presenting signs, particularly when correlated with survival data, areas of medicine could be identified where veterinarians and rehabilitators should concentrate their research efforts. These statistics may be useful to not only veterinarians and rehabilitators, but could potentially provide another resource for decision-makers involved in managing human-wildlife interaction (eg, federal, state, and local planning agencies and regulators).

Methods

A survey form was sent to representatives of the 4 major wild bird rehabilitation centers in Alaska (Alaska Raptor Center in Sitka; Deer Mountain Tribal Fish Hatchery and Eagle Center, Ketchikan; Juneau Raptor Center, Juneau; Bird Treatment and Learning Center, Anchorage). The survey collected data from bald eagle admissions during the years 1993 and 2003 in 2 areas: injury causes and specific injury details. The categories within each of these areas are listed (Table 1). In addition, there were some categories that were added by the rehabilitators but were not reported by all 4 facilities (these will be added to future surveys). Injury causes were reported on a one-primary-cause per case basis. Although it is recognized that multiple causes may contribute to a patient's demise, for purposes of this study, the most-immediately contributing cause was selected for each case. Injury details were reported on an as-many-as-may-apply per case basis. Thus, there is 1 and only 1 injury cause per case but there may be any number of injury details reported per case (including zero if the injuries did not fit any major category).

Selecting a primary cause of injury is usually based upon a mixture of presenting signs, history from rescuers (who may or may not be experienced), and experience of the rehabilitator with common activities in particular locales and times of year. For example, a bird presenting with symmetrical wounds around its tarsometatarsus; macerated, frost-bitten wingtips; and a presenting history of being rescued in the winter from an area where

Table 1. Injury Cause and Detail Categories: Only one primary cause per case.

Injury Cause Categories[a]	
Disease	Infectious diseases such as aspergillosis, avian pox, trichomoniasis, hawk cholera (pasteurellosis). Not secondary diseases such as parasitism.
Elect	Electrocutions
FTT	Failure to thrive. Generally applies to juveniles that are starving due to inexperience.
Tackle	Fishing or fish-related tackle including line, hooks, or nets.
Traps	Leg-hold trap damage or detainment.
Gunshot	Gunshot wounds.
Poisoning	Toxicities from lead, zinc, mercury, organophosphates (pesticides), barbiturates (euthanized animals), etc.
VC	Vehicular collisions on land, sea, or air (cars, planes, boats).
Other	Anything that doesn't fit into any other major category. Could include orphans, collisions with windows, mauled by a bear, struck by lightning, etc.
ISC[c]	Intraspecies conflict. Two eagles fighting over food, perches, territory, etc. Not a conflict between an eagle and any other species.

Injury Detail Categories[b]	
CFx	Closed fractures
OFx	Open fractures
Pox	Avian pox lesions
Trich	Trichomoniasis
Pb	Plumbism (lead poisoning)
OP	Organophosphate poisoning
MinWnd	Minor wounds (skin-deep only and less than 5% of body surface area (able to closed surgically)).
MajWnd	Major wounds (deeper than skin, greater than 5% surface area.
HypoTh[c]	Hypothermia/exhaustion
Emac[c]	Emaciated
Impaction[c]	Gastrointestinal impaction.
Frostbite[c]	Frostbite wounds
Emaciated[c]	Loss of muscle mass of at least 10% of normal body weight.
Neuro[c]	Neurological symptoms
HypoTP[c]	Hypoproteinemic on admission
Joint/M/T[c]	Joint disease or injury, muscle/tendon strain or injury.
Ophtho[c]	Ophthalmic (eye) injury
Asper[c]	Aspergillosis
Beak Inj[c]	Beak injury

[a]Only one cause per case [b]Numbers of injury details reported for each case is variable (some may not have any reported details if there was not an applicable major category) [c]These categories were added by one or more of the surveyed organizations but were not uniformly reported by all. They will be added to future surveys.

trapping is known to occur is likely to be a trap victim (wing damage comes from flapping against the ground repeatedly in escape attempts). Even more conclusive to this example would be if the bird were actually removed from the trap by the rescuer.

Each cause category and detail category also was broken down into a case outcome category as follows: pending, released, transferred, died, euthanized, and DOA (dead on arrival). Pending cases were those that had not been concluded yet. Released patients had been released back to the wild. Transferred patients included those that had been transferred for medical referral or for permanent placement (eg, non-releasable). The "died" category referred to only those birds that had expired unintentionally (they were not euthanized) after admission. Euthanized and DOA are self-explanatory. It should be noted that most transfers occurred to other facilities within Alaska (both the Alaska Raptor Center and Bird Treatment and Learning Center act as referral centers in addition to taking in their own patients). This means that in terms of total admissions, some birds were counted twice. Due to limited time, as of the time of this writing the double intakes have not been sorted out. Future surveys will attempt to avoid this problem. The results of the surveys were entered into a spreadsheet (Excel, Microsoft, Redmond, WA, USA) for analysis.

Results

Results were analyzed as percentages of cases and, in the case of injury details, percentages of total injuries reported. Figures 1–2 summarize the data graphically. Other tables and figures will be used to elaborate upon the data during the presentation at the conference.

Discussion

This was the first time such a survey had been performed in Alaska, so there were several shortcomings. First, the data contained some cases that were counted twice because birds were occasionally transferred to one of the other facilities for further care. Also, 2 facilities did not have data available for 1993. Finally, there may have been some omission of specific injury details (eg, emaciation) either due to lack of such specific data in the records or because the category was not included in the master survey that was sent out (eg, suggested by a participant in the returned survey). It is the author's plan to conduct a similar survey annually and improve the process with each successive year. However, some trends were considered significant enough by the author to be valid despite the limited nature of the survey.

Most bald eagles admitted to rehabilitation centers in Alaska have sustained injuries directly attributable to human activity (such as collisions with vehicles on land, air, or sea, electrocutions, gunshot, and by-catch in leghold traps). Most admitted eagles in 2003 sustained trauma-related injuries (63%). The most common traumatic injuries were fractures (28%), wounds (17%), and tendon or joint trauma (11%). There was insufficient data to produce injury detail statistics for 1993. These statistics suggest that collaboration and research efforts between the participating organizations should focus on treatment of orthopedic injuries and wound management techniques because those are the most common presentations.

Injury causes included a significant number of cases in which the exact cause was unknown. Many of these "unknown/other" cases presented with trauma, but this was not a presented subcategory. Future surveys should include an "unknown trauma" category or causes and effects should somehow be linked on a case-by-case basis to allow further differentiation. Known injury causes showed similar trends both by percentage and total admits

between 1993 and 2003. Electrocutions and failure-to-thrive increased significantly. Occurrences of both of these can change due to factors such as booms in local population (eg, herring returns can cause overcrowding of perches in a town and drive more birds to less desirable perches on city power poles), changes in food availability, or harshness of weather (most failure-to-thrive cases are generally seen in Fall and Winter). In general, all categories of injury cause increased except "other/unknown," which decreased dramatically. This is probably due to improved diagnostic skills and better availability of diagnostics such as radiography. However, it does appear that prevention efforts, such as public outreach, have not been highly successful at "turning the tide." All 4 participating facilities conduct educational outreach activities which, in part, are an effort to reduce occurrence of preventable injuries. These programs perform a valuable function at raising the general sensitivity of the populace to environmental issues and encourage people to modify their attitudes and activities to cause less harm to wildlife. Perhaps more outreach and political action efforts directed at the local level, particularly the smaller villages of Alaska, may be more effective to reduce "preventable" types of injuries such as those caused by electrocution, leghold trap by-catch, gunshot, and, to some extent, vehicular collisions. By sheer number, most of the persons reached in these programs are from out-of-state. Bird Treatment and Learning Center appears to be the leader in accessing smaller communities (to their advantage, they are the only facility with access to the highway system—the others are more remote). Because travel to remote sites presents a fiscal challenge, perhaps other technologies, such as the internet, can be used to disseminate the same information in a fashion that is tailored to those communities' unique lifestyles.

Grouping admits according to human contribution to injury, directly man-induced injury causes (vehicular collisions, electrocution, gunshot, trapping by-catch, fish tackle, and poisoning) contributed to 49% of admits in 2003. Indirect or "natural" causes of injury (disease, failure-to-thrive) accounted for 16%. Other or unknown causes accounted for 35%. Grouping occurrences of presenting signs by traumatic (fractures, wounds, ophthalmic injuries, and beak injuries), atraumatic (impaction, infectious diseases, poisoning, hypothermia, hypoproteinemia, and emaciation), and either (frostbite, neurological disorders, and joint or tendon problems) was also performed. Lesions suggestive of trauma accounted for 65% of all presentations, atraumatic presenting signs accounted for 16%, and approximately 19% of the presentations could fit into either category. In the case of joint and tendon problems, most were related to trauma but there were some cases of infectious joint disease that could not be determined as solely trauma-related (eg, no wound or visible point of entry for pathogens).

Finally, despite the low apparent incidence of disease in wild eagle populations, this is probably underrepresented. Many birds likely die and are never found or are incompletely diagnosed due to limitations in funding for laboratory tests and veterinary participation. Despite this likelihood of under-representation, rehabilitation facilities do act as a collecting point for birds from all over Alaska. This means that they probably act as valuable sentinels to detect the first landfalls of diseases such as West Nile Virus and act as monitoring stations to track seasonal and annual trends in such diseases. They can also act as monitors of environmental health (eg, toxins, nutritional status, etc.) because they are dealing with apex species. Annual surveys of collecting points, such as rehabilitation facilities, may be the best way to track the health status of wild birds in a place as large and remote as Alaska.

In conclusion, further years of similar surveys should provide a valuable resource for wildlife professionals. This analysis tool could provide important information upon which wildlife organizations could base their public-outreach program decisions. It could also provide input for veterinarians to decide where they should focus their medical research efforts in regards to care of wild birds. Finally, it may help regulatory bodies in their land-use and wildlife management decisions.

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Recommended Reading

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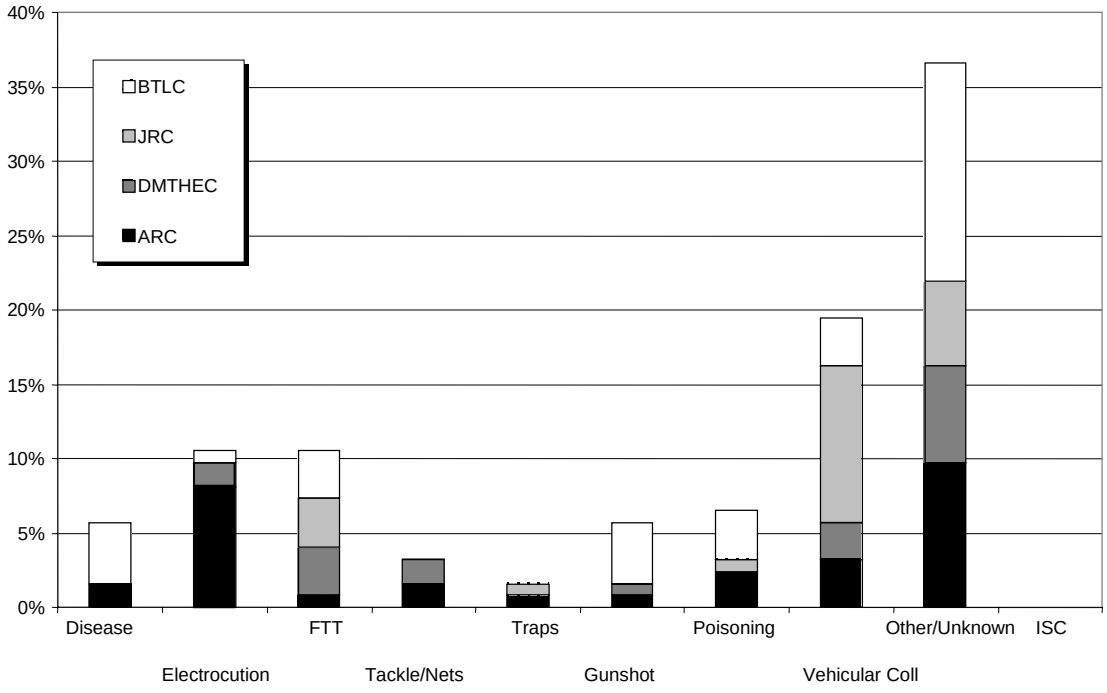

BTLC = Bird Treatment & Learning Center, Anchorage, AK
JRC = Juneau Raptor Center, Juneau, AK
DMTHEC = Deer Mountain Tribal Hatchery and Eagle Center, Ketchikan, AK
ARC = Alaska Raptor Center, Sitka, AK

Figure 1. Percent admits by injury causes and admitting center (2003 only).

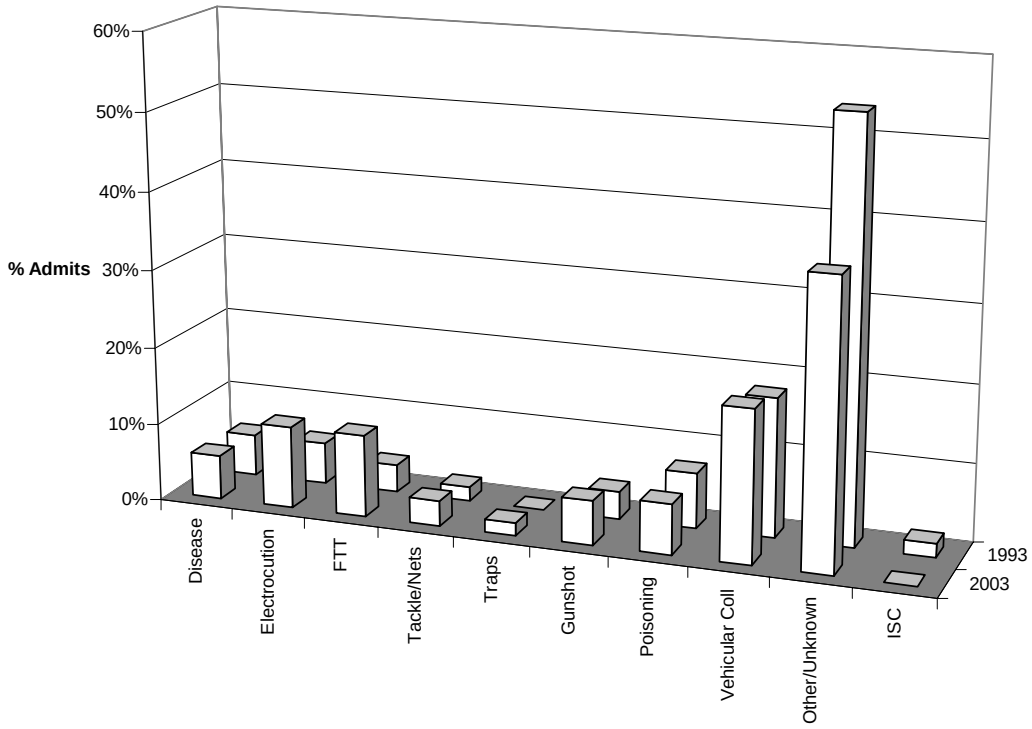

Figure 2. Percent admissions of bald eagles by injury cause and year.

The Critically Endangered Puerto Rican Amazon Parrot: A Veterinary Overview

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Abstract: One hundred and forty-nine Puerto Rican Amazon parrots (*Amazona vittata*) are currently kept in captivity at 2 aviaries on the island of Puerto Rico, in Rio Grande (Luquillo Aviary) and in Utuado, (Rio Abajo Aviary). Close to 40 individuals are currently found in their natural habitat in a wild flock at the rain forest of El Yunque. This paper provides an overview of the veterinary care of both the149 Puerto Rican Amazons kept in captivity, the veterinary field work for the wild flock, and presents insights on how the veterinary, biological, and ecological issues are integrated into a successful reintroduction program.

Introduction

The Puerto Rican Amazon (*Amazona vittata),* a 30–33 cm tall, 250–300-g, red-fronted, shiny green white-eyed parrot, is the last endemic psittacine bird that inhabits the Caribbean National Forest (CNF), known as El Yunque on the island of Puerto Rico.[1] The wild population was estimated to be at 2000 individuals in 1930. By 1967, the year when the bird was listed endangered, only 24 individuals remained in the wild. The lowest number reached was in 1975 when only 13 birds were left in the Luquillo Mountains. Trends suggested that extinction was imminent and that the only reasonable hope for the species was to begin captive breeding.[1–4] The program was started in 1970; by 1972, there were 4 birds in captivity. The first captive-reared bird was produced in 1979.[4] Multiple factors contributed to the Puerto Rican Amazon population decline, including habitat loss due to deforestation, scarcity of nesting cavities, hurricanes, hunting, nest robbing, and natural enemies (ie, red-tailed hawks [*Buteo jamaicensis*], rats [*Rattus rattus, Rattus norveigicus],* pearly-eyed thrashers [*Margarops fuscatus*], endemic Puerto Rican boas [*Epicrates inornatus*], parasitic flies [*Philornis-pici*] infesting the chicks, Africanized bees [*Apis mellifera*],and mongoose [*Herpestes auropunctatus*], etc.).[1–5] The species has survived in the wild thanks to an aggressive protection program, a cooperative effort lead by the US Fish And Wildlife Service (USFWS), with the assistance of the US Forest Service (USDA/FS), the Puerto Rico Department of Natural and Environmental Resources (PRDNER), and the sustained release of captive-raised Puerto Rican Amazons into El Yunque.[6] Currently, in the Luquillo Mountains within the Caribbean National Forest, only 1 wild flock of approximately 40 individuals exists. Two captive populations are held in 2 separate aviaries: one group at the CNF managed by USFWS and the other at the Rio Abajo State Forest (RASF) in Utuado under the PRDNER. A second flock of captive-raised Puerto Rican Amazons is to be released in 2006 in the Karst region in the mountains of Utuado at the Rio Abajo State Forest.[2,6] The present article summarizes the current veterinary health management of the captive and wild populations at the Luquillo and Rio Abajo aviaries.

General Aspects

Puerto Rican Amazon parrots travel in pairs or in small flocks and feed on seeds, fruits, and the bark or leaves of over 60 plant species.[3,4] Important sources of food include the Sierra Palm (*Prestoea montana*) and to a lesser extent the tabonuco tree (*Dacryodes excelsa*). The parrots nest once per year in the months of January to July. The female lays 3 or 4 eggs per clutch and incubates them from 24–28 days. The chicks usually fledge at 60–65 days; both parents feed and take care of the chicks.[1,6] Once the juveniles fledge, they form family groups in which they learn to survive in the wild via feeding, predator avoidance, etc. Puerto Rican Amazons bond for life. At 3–5 years of age, these young adults will form pairs and nest in a natural cavity in a tree trunk, usually a Palo Colorado (*Cyrrilla racemiflora*). When the pair is successful in breeding at the chosen nest with at least 1 chick fledged, they return to the same nest to reproduce every year for the rest of their lives.

Reintroduction Efforts

The Puerto Rican Parrot (PRP) Recovery Program is an effort to conserve, protect, and manage the wild and captive population of this native bird with the goal to establish stable wild populations.[1,3,4] During the last 36 years, these efforts have concentrated on gaining a better understanding of the breeding biology and requirements of this species, as well as on the management of the habitat, the wild population, and the establishment and management of a captive population. Another component has been added to the recovery efforts of the species: the release of captive-reared PR parrots to historical habitat such as the Karst. Release of captive-reared PRPs to increase the wild population has long been recognized and recommended as crucial step towards recovery of the species.[2,5] The technique of fostering chicks from the aviary to a nest in natural habitat to be reared by wild parents limits the number of captive birds that can be introduced into the wild.[4] This results in a steady accumulation of parrots produced in captivity that otherwise would be available for release and augment the wild population. During 2000, 10 PRPs were released into the wild. In 2001, 16 PRPs were released and in 2002, 9 PRPs were released into the CNF. The average survival of these releases was 35–50%.[2,6] In all these program components, the integration of veterinary clinical input, as well as sound integration of biological and ecological understanding, has been key to the effective implementation of recovery actions for the species.

Captive management

Currently, 55 Puerto Rican Amazons (26 females and 29 males) and 14 Hispaniolan Amazons (7 males and 7 females) are kept at the Luquillo Aviary in Puero Rico. The Hispaniolan Amazons are used as surrogate parents for egg sitting and brooding. At the Rio Abajo Aviary, there are 94 Puerto Rican Amazon parrots, comprising 33 males, 34 females, and 27 birds of unknown sex. Out of the known males and females, 17 pairs have been formed. There is also a population of 40 Hispaniolan Amazons at the Rio Abajo Aviary. Birds are kept in outside cages during the year except prior to the breeding season and as needed when a hurricane approaches Puerto Rico, when they are moved to an enclosed facility for their protection. The birds are also moved from outside cages for annual physical examinations and as necessary to clean and disinfect their cage and nest areas. During the annual physical examinations, one-third of the population is examined and their blood is tested. The tests include CBC, chemistries, bile acids, stool sample evaluations, choanal and cloacal cultures and sensitivities, and choanal and cloacal Gram stains. Birds are also tested for *Polyoma* virus, Psittasine Beak and Feather Disease, *Chlamydophila psittaci*, *Salmonella*, and Pacheco's disease. The birds that have been tested for the above-mentioned infectious diseases have been consistently negative. Further tests include DNA sexing, DNA banking, and pedigree analysis, which are performed on the nestlings. The diet consists primarily of pelleted food, naturally found foods like Sierra palm, cupey (*Clusia* species) at Luquillo, wild guava fruit (*Psidium guajava*) at Rio Abajo, and vegetables.

The birds at the Luquillo and the Rio Abajo Aviary were managed as a single captive population. Birds were constantly moved between aviaries and systematically released in to the wild. In January 25, 2002, a female Hispaniolan Amazon from the Rio Abajo Aviary was diagnosed with lesions consistent with Proventricular Dilatation Disease (PDD). The tissues were examined by another pathologist, who found lesions consistent with infection possibly by West Nile Virus (WNV), and not PDD. We conducted crop biopsies for PDD, and serology analysis for WNV of the cage mate and 5 other birds from the same aviary, and all samples were negative. Despite the difference in pathologists' opinions, and negative results for the tests described above, it was decided to discontinue both the bird transfer between aviaries, and the release of birds from the Rio Abajo Aviary in the CNF.

The Aviaries

Disease problems of the population

Routine veterinary input at both facilities was achieved through frequent aviary visits to both aviaries and constant telephone communication. Improvements to the aviary hospital are constantly done, with the purpose of providing our birds better medical care. Time is always spent with the aviary personnel, aviculturist, and field biologist. Their input is fundamental in trying to identify the potential sources of problems, and solutions to them. This has been achieved through regular aviary visits, integration of management and veterinary issues, and open communication.

Egg contamination, infertility, and chick mortality had been a major problem at the Luquillo Aviary. High environmental humidity has been associated with fungal and bacterial overgrowth of the nest material, and with subsequent contamination of the eggs and chicks.[7,8] Because of the compromised immune status of the chicks, this problem probably resulted in young chick fungal pneumonia and subsequent death.[7] This may also have affected the eggs causing developmental problems and early embryonic death.[7,8] To lower chick mortality and egg contamination, we started autoclaving nest material, assuming this was the source of the fungal spores and bacterial isolates found on cultures performed on nest contents from the field, the aviary, and on necropsies. By using autoclaved nest material during egg laying, prior to hatching and during chick development, and with thorough disinfections of the nests, we were able to control the fungal and bacterial overgrowth. The measures described here yielded increased survival of the chicks.

Egg related problems have included, assisted hatching, egg fractures, and incubation. Thorough physical examinations and ancillary testing are performed in every single chick born at the aviary. This includes bacteriological and fungal cultures, fecal analysis and Gram staining. They are also tested for polyomavirus, psittacine beak and feather disease, *Chlamydophila psittaci*, herpesvirus, and *Salmonella*.

Periodically bird aggression, which can result in the cannibalization of baby birds, egg abandonment, and infertility, has been a serious problem. Male aggression can result in the psychological caponization of a neighboring male.[9] Therefore cages of aggressive pairs were alternated with Hispaniolan pairs. Cages of docile pairs were placed next to each other. In order to minimize bird disturbance, visual barriers had also been installed between cages as a part of an improved management plan.[9] In addition, constant bird monitoring has been achieved through the use of closed circuit cameras located on all the flocking and breeding cages at the Luquillo Aviary. This monitoring is essential in helping to identify the most aggressive pairs, and in targeting potential breeding and disease problems. Trauma, always a potential problem due to the aggressive nature of Amazon parrots (wounds, fractures, etc), has been managed according to each particular case.

To improve fertility and stimulate breeding behavior, the following steps were necessary: minimization of bird disturbance during the breeding season, close bird monitoring during copulatory activities, improved cage perching, and diet modification, both prior to and during the breeding season. Habitat enrichment, which is thought to improve breeding and fertility, was carried out by staff of both aviaries. It included not only fresh "cupey" tree branches and leaves, but also toys and food items of varied color and shape.

Laparoscopic evaluation of the gonads of non-breeding and infertile pairs was performed and testicular and ovarian biopsies were obtained.[10] Thanks to this study, we have been able to evaluate reproductive organs visually as well as histologically in our non-breeding infertile male and female birds. This management tool assisted with increasing the effectiveness of bird pair matching.

Fungal and bacterial infections are a common finding in hand reared and adult birds, and are medically managed based on the results of Gram stains, culture, and sensitivity reports.

Zinc toxicosis has been diagnosed and managed at the Rio Abajo Aviary. A protocol of cage cleaning with acetic acid was established to help prevent this problem.[2]

Amazon Foot Necrosis, a disease of poorly understood etiology, may be caused by bacterial infection, immunological disorders, and environmental contaminants.[7,8] It has been managed by the use of medical and surgical therapy.

Feather mites identified in most of the birds at the Luquillo Aviary, were treated with 5% Sevin Dust (Sevin carbaryl, 1-Naphthyl N-methylcarbamate, Garden Tec, Lexington, KY, USA) and Ivomec 200mcg/kg PO (Ivermectin, Merial Limited, Iselin, NJ, USA). We treated the entire flock, believing this problem, as well as associated problems, such as pruritus and self-inflicted trauma, can affect reproductive performance.

The Field

In the field there are health issues that require emergency actions as well as immediate on-site veterinary input. Field biologists constantly monitor all active nests. Previously, microphones were installed in nest cavities to monitor activity, as well as chick and parent vocalizations. A new development for the 2003 breeding season was the installment of video cameras in the nest cavity, which improved baby bird monitoring from the blind. Any changes in weight gain, the degree of activity, vocalizations, or presence of illness have been immediately reported to the veterinarian.

Chicks have been blood tested in the field for many diseases, including *Salmonella*, poloymavirus, psittacine beak and feather disease, *Chlamydophila psittaci*, and Pacheco's disease. Bacteriological and fungal cultures, choanal and cloacal Gram stains, and fecal samplings have also been performed. Thanks to this protocol during the 2002 breeding season, we were able to appropriately treat 2 chicks that were ill in a nest. Integrating biological concepts with veterinary understanding was important in achieving this feat. We reached the consensus to remove 1 chick, treating it at the aviary, and later returning it to the nest. The other chick was treated at the nest in the wild, which turned to be the most adequate management option. Both chicks fledged from the nest, which we were able to maintain as an active nest site.

DNA samples from each wild chick are tested for genetic composition. Based on these results, wild chicks may be interchanged with captive-raised chicks in order to increase the genetic diversity of the population.

All active nests are visited by the veterinarian, and all nestlings are examined several times prior to fledging as a part of our routine medical management plan, 5% sevin dust (Garden Tec) has been used routinely in the nests in the field to help prevent infestation by warble flies in our chicks. This also helped eliminate other insects commonly found in the nests that might affect the chicks, such as fire ants (*Solenopis invicta)*, termites (*Reticulitermes flavipes*), soldier fly (*Hermetia illucens*) larvae, etc. This may also treat the parents against external parasites commonly found in other wild birds. Ivermectin 200 mcg/kg (Merial) as well as surgical removal have been successfully used in the field to treat chicks infested with larval warble flies. Ideas on nest design, release bird training, and medical evaluations have been discussed with field biologists.

Release Birds

Prior to release, the bird's ability to survive in the wild is always assessed by a veterinarian using complete physical examinations. Birds' weights are monitored and recorded throughout the release training process. Bird feathering, ability to flight, stamina, and tameness, are accounted for. Laboratory testing on these birds includes choanal and cloacal cultures. Bird radio collaring before release has been done with the help of the veterinarian.

Conclusion

The work that we all perform as avian veterinarians is fundamental in the delicate process involved in a recovery program. We play an extremely important role in the recovery of any threatened avian species in the world. But only by understanding the biological, as well as ecological aspects, and integrating this understanding into our clinical practice can we achieve our ultimate goal: survival of a species, and its reintegration into the wild.

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