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Together We Grow

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Posters

AMERICAN ASSOCIATION of ZOO KEEPERS

OMAHA'S HENRY DOORLY ZOO & AQUARIUM

Posters

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"Littles" Helping "Littles Grow"

Wildlife Conservation Society- Bronx Zoo
Samantha Gaeta, sgaeta@wcs.org

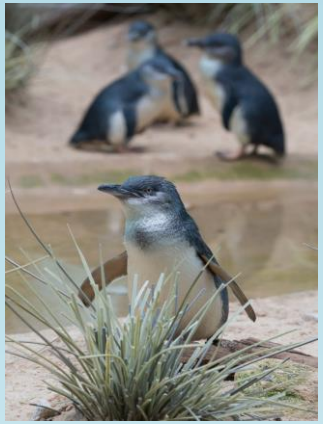
The story of how one Penguin population in Kentucky helped aid the growth of a New York population. Keepers traveled by car over 1700 miles from the Bronx to Louisville to pick up and transport Little Penguin eggs. It was our job to make sure the portable incubator was running correctly the entire car ride home. We were to act as surrogates and rotate the eggs every two hours to ensure the survival of the chicks. We had a few stops along the way to make some adjustments in order to insure the safe return of the eggs. During the drive we encountered a snow storm, which added additional hours and stress onto the trip. What should have been an eleven hour drive turned into a seventeen hour drive. We arrived safely and were able to set the eggs up in an established incubator at the Bronx Zoo. Within a week the eggs began to hatch. We successfully hatched two chicks and were on to our next challenge. Hand Rearing. The Bronx Zoo was new to hand rearing Little Penguin chicks from day zero, but we passed the test with flying colors. We successfully raised the two chicks, and in the spring when they have lost all their down, and are waterproof, they will be introduced to the colony in hopes to breed with the resident birds. The introduction of these two birds will bring new genetics into the Bronx's gene pool. In conclusion, one institution was helping another "Grow".

“Littles” Helping “Littles” Grow

By Samantha Gaeta Wild Animal Keeper Wildlife Conservation Society’s Bronx Zoo Ornithology Department: SGaeta@WCS.org

Introduction:

The story of how one Penguin population in Kentucky helped aid the growth of a New York population. Zoos all over the world ship and receive animals to add to their collection and participate in collaborative breeding programs. In most cases, they are transferred to be a companion for a lone individual or transferred to be a potential mate. This particular transport involved two separate transfers. We first drove from NY to Ohio to deliver two female marbled teal to the Cincinnati Zoo. We then drove from Ohio to Kentucky to pick up fertile little penguin eggs, to then drive them back to New Yorks Bronx Zoo. It was our job to make sure the eggs arrived safely and continued to incubate correctly. We encountered a snowstorm along the way and needed to make multiple changes to ensure the safe arrival of the eggs to WCS.



Transport:

Keepers traveled by car a total of over 1700 miles between the Bronx, NY, Cincinnati, OH, and Louisville, KY to transport ducks and then pick up and transport little penguin eggs. It was our job to make sure the portable incubator was running correctly the entire car ride home. We were to act as surrogates and rotate the eggs every two hours to ensure the survival of the chicks. We had a few stops along the way to make some adjustments in order to ensure the safe return of the eggs.

Supplies For Traveling:

- Insulated Cooler
- Hot Water Bottle
- Tegaderm & Scissors (Egg Repair)
- Flashlight
- Instant Hot Packs
- Water Bottle
- Thermometer
- Car Port Electrical Outlet Converter

Portable Incubator:

- Owners Manual
- Parameters (36.5*C / 55% RH)

Clipboard for Notes:

- Recording temperatures every hour
- Turning eggs every two hours
- Documenting any changes that were made to incubator
  - Spraying water to raise humidity, hot packs to raise temperature, etc.

From Hatching to Hand Rearing:

We arrived safely and were able to set the eggs up in an established incubator at the Bronx Zoo. Within a week the eggs began to hatch. We successfully hatched two chicks and were on to our next challenge: hand rearing. The Bronx Zoo was new to hand-rearing little penguin chicks from day zero, but we passed the test with flying colors.

- We established a protocol on how to make the Penguin Gruel (Penguin Chick Formula).
- Recorded weights of chicks before and after each feed to ensure the chick was eating an appropriate amount of food at each feed.
- As chick matured, so did their diet. We weened the chicks off formula and onto fish filets, and continued this process until the chicks were able to eat whole fish.

Conclusion:

The trip granted us the ability to see the set-ups of two other zoos who have successful little penguin programs. To learn with staff, and bring home some new ideas/strategies/information to help us excel. We successfully raised the two chicks, and in the spring when they have lost all down, and are waterproof, they will be introduced to the Bronx Zoo colony in hopes to breed with the resident birds. The introduction of these two birds will bring new genetics into the Bronx’s gene pool. In conclusion, one institution was helping another “Grow”.

Credits/ Affiliations: Wildlife Conservation Society, Cincinnati Zoo, Louisville Zoo, Nancy Gonzalez, Terria Clay, Leela Samaroo, Hannah Hughes, Chuck Cerbini, and Kenneth Huth.

The Little Penguin Species Survival Program: (TAG Monitored)

The Little Penguin is the smallest species of penguin in the world and is found exclusively in Australia and New Zealand. The global population size is estimated as 469,760 mature individuals (IUCN Red List of Threatened Species. 2018-2).

The first importations of Little Penguins into North America were between the 1950's and early 1960's by the San Diego Zoo. Most of these penguins died within a year or two of importation. More importations occurred in 1971 by the Detroit Zoo and in 1975 by the Montreal Aquarium/Biodome. San Diego transferred the remainder of their population to the Detroit Zoo in 1986. The Detroit population died out in the 1980's except for one 25 year old penguin that died in 2009. The biodome exported all their remaining Little Penguins to Japan in 1991 and 1992.

The second wave occurred in 1995 with an importation by Omaha from Taronga Zoo in Australia and in 1996 from Jurong Birdpark in Singapore. This was followed in 1997 and 1999 with importations from the Melbourne Zoo by New England Aquarium. The Cincinnati Zoo also began to import penguins from the Taronga Zoo in 1999.

A cooperative import of 22 penguins by the New England Aquarium and the Cincinnati Zoo occurred in June 2012. In 2015, a second cooperative import of 24 penguins launched 3 colonies at the Bronx Zoo, Adventure Aquarium, and the Louisville Zoo. In 2021 a collaborative effort was initiated between the Birch Aquarium, Adventure Aquarium, and the Cincinnati Zoo and Botanical Gardens to import 10 individuals. Six male and four female penguins from three facilities in Australia were imported to the United States. Five of them, two males and three females went to the Cincinnati Zoo, while the other five, one male and four females remained at the Birch Aquarium to become part of a new exhibit that opened in 2022.

The ABQ Biopark will be joining the little penguin program with a new exhibit scheduled to open in 2024. This will increase the number of AZA institutions, now participating in the program, to seven.

Bowling Pins for Rhinos - Turning Art into Conservation

Point Defiance Zoo & Aquarium
Russell Pharr, russellpharr@gmail.com

Since 2020, the Point Defiance AAZK Chapter has held an art contest, “Bowling Pins for Rhinos” as part of its annual Bowling for Rhinos fundraising effort. This innovative contest challenges entrants to take a used bowling pin (donated by local alleys) and turn it into a work of art. Over the past five years, this contest has seen many incredible creations and has become a fan favorite as bowling pins have been turned into everything from lamps and gnomes to Space Needles and race cars – and of course animals of every description. Although it debuted during the COVID-19 pandemic, Bowling Pins for Rhinos has been tremendously successful and has coincided with an era of record BFR profits for the Point Defiance Chapter. Bowling pin art contests are easy to organize, generate profits multiple ways (through contest registration and the sale of pins in an online auction), and can be a fun and exciting way to spice up your BFR event.

Bowling Pins for Rhinos:
Turning Art into Conservation

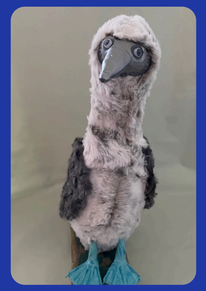
Russell Pharr, Point Defiance AAZK Chapter

What is Bowling Pins for Rhinos?

- An annual art contest hosted by Point Defiance AAZK Chapter, celebrating its 5th anniversary in 2024
- Contestants are challenged to turn used bowling pins into works of art, which results in some amazing creations and highlights talent in our community
- Winners in various categories are chosen by public vote, which thanks to the magic of social media has included votes from around the globe!
- The contest is one part of our chapter's annual Bowling for Rhinos fundraiser - all funds raised go to BFR

How Does Bowling Pins for Rhinos Work?

- Used bowling pins are donated by local alleys (pins break all the time, and most alleys are happy to have someone take them off their hands)
- Contestants sign up using Google Forms and PayPal, receive pin(s), and start making art
- Pins completed by the deadline are displayed in our zoo's Administration building while an online vote happens
- Prizes are awarded for winners in each category
- A selection of bowling pins are included in our chapter's Bowling for Rhinos silent auction, which kicks off after voting is complete



Why Do Bowling Pins for Rhinos?

- It's a fun, interactive way to raise BFR funds that engages the community – we have contestants from inside and outside the zoo
- Bowling Pins for Rhinos helped revitalize our BFR fundraising; even though it debuted during COVID we raised more money in 2020 than we had in 2019. Every year since, we have set an all-time chapter fundraising record!
- New designs are created every year and people are excited to see each new year's pins, which keeps the event from feeling stale
- Bowling pins make money twice – first with registration fees (we charge $25/pin) and then when they are sold in a silent auction

Host Your Own Bowling Pins for Rhinos!

- Bowling pins for rhinos is easy to organize and we would love to see it hosted by more chapters! It would be great to have a champions' contest between AAZK chapters one day
- Please reach out with any questions: pointdefianceaazk@gmail.com

Point Defiance AAZK Chapter

Guest experience and engagement at Disney's Animal Kingdom® veterinary hospital

Disney's Animal Kingdom®
Jill Magee, Jill.E.Magee@disney.com

Since the opening day of Disney's Animal Kingdom® theme park on April 22, 1998, the veterinary window has allowed our Disney's Animal Health team to engage our guests and create guest experiences at our veterinary hospital. The veterinary viewing window allows our guests to experience our medical procedures alongside our team of veterinarians, veterinary technicians, and animal care teams. The health team works in partnership with the attraction team to staff a cast member, who is present all day, to share information with guests about our veterinary hospital and all we do, as well as procedure information as it occurs.

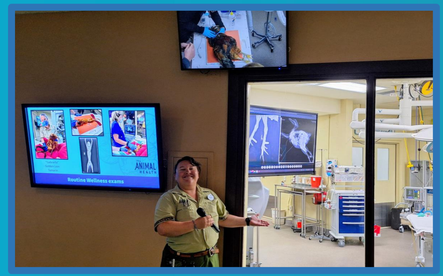
In addition to the cast member sharing information our team is able to engage our guests through in person appearances from the health team, the use of technology such as live video feeds and audio to share in depth procedure information, updates from the animal keeper and medical teams as the procedure unfolds and summaries of the animals' recovery and treatment plans. This communication allows us to be completely transparent in the medical care of our animals. It also allows guests to engage directly with the team through microphones.

We have spontaneous in-person meetings with the Health team in the guest area before and after exams as well as planned talks throughout afternoon.
We also conduct backstage tours for guests and programs such as school age camp experiences, Disney Dreamers academy, veterinary shadows, and animal keeper career opportunities.

Since Disney's Animal Kingdom® opened its doors in 1998, the veterinary hospital has provided guests with a unique opportunity to observe and learn about animal care.

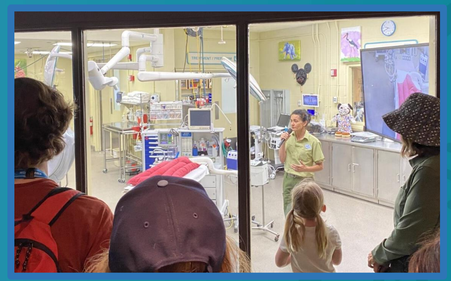
Through a dedicated viewing window, guests can watch live medical procedures performed by veterinarians, technicians, and animal care teams. This interactive experience is further enriched by cast members who are available to explain the processes and answer questions, offering detailed insights into the hospital's operations and specific treatments.

This initiative not only enhances guest engagement, but also fosters a deeper understanding of veterinary practices making it an integral part of the educational experience at Disney's Animal Kingdom®.



Operations cast member interacting in the guest area

Primate getting diagnostic exam



Hospital keeper sharing procedure details through the audio system

Live interactive presentation of hospital patients and procedures.

Disney Dreamers Academy

Conservation camp

Backstage tours

We strive to create learning opportunities through continued education.

Dr. Betsy meeting a guest fan backstage

We create magic moments with one-on-one interactions both onstage and backstage.

Disney ANIMAL HEALTH

Jill.E.Magee@disney.com

Guest Experience and Engagement at Disney's Animal Kingdom® veterinary hospital

Jill Magee
Hospital Keeper

Age Has No Limite When it Comes to Learning to Trust: Medical Training for a Capybara

Ecoparque de Buenos Aires
Emiliano Scolese, emilianoscolese@gmail.com

The Buenos Aires Ecopark in Argentina has provided excellent care and well-being to the animals in its facilities during its long history. When we received an older capybara named Hannibal, we knew it would be important to include him in our medical training program to ensure we could have regular health checks with our veterinarians. During this presentation, you will learn how our team helped Hannibal adjust to his new environment, desensitize him to his new care team, the steps we took to make him a willing participant in his own healthcare, and his progress to date. . proving that age has no limits when it comes to learning to trust.

Age Has No Limit When It Comes to Learning to Trust
Hannibal's Teachings: Medical Training for a Capybara
(*Hydrochoerus hydrochaeris*)

Emiliano Scolese, Keeper
Lucas Flores, Keeper
Ecoparque de la Ciudad
Buenos Aires, Argentina

As soon as Hannibal, an 8 year-old capybara, arrived at the Ecoparque of Buenos Aires, we integrated him into our training program, in order to help him adapt to our facilities and become a voluntary participant in the veterinary checkups prescribed to an individual his age. Here are some of the valuable teachings that we learned along the way and how working with Hannibal changed us in many ways

A Difficult Start

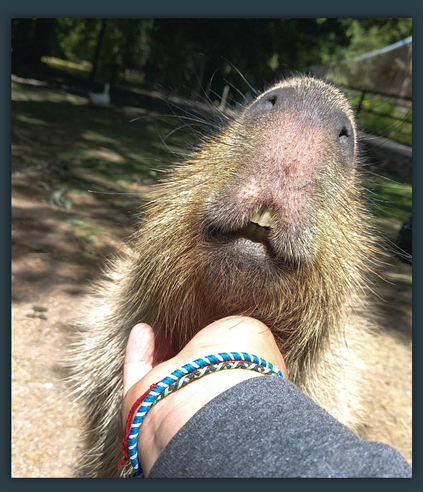
- Hannibal struggled with socialization, facing peer aggression and isolation.
- His behavior became secretive, leading to weight loss, lack of appetite, and decreased activity.
- He was moved to a solitary environment to reduce stress and improve well-being.
- Initially he was reluctant to interact with zookeepers due to his age and behavioral issues.

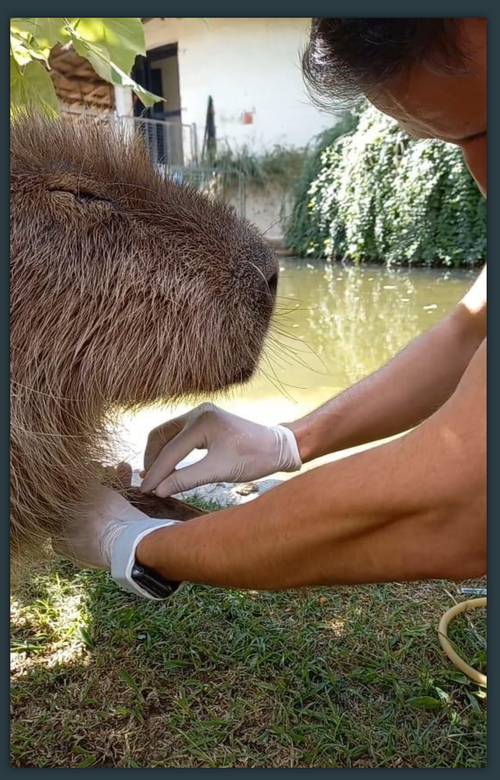
First Steps

- Slow but promising progress, allowing Hannibal to set the pace through negative reinforcement techniques.
- Gradual improvement in tolerance and proximity to zookeepers.
- By the tenth day, zookeepers could be in the same space without causing agitation.
- After 15 days, Hannibal responded to his name and allowed gentle contact.
- Within a month, he began to seek petting from keepers.

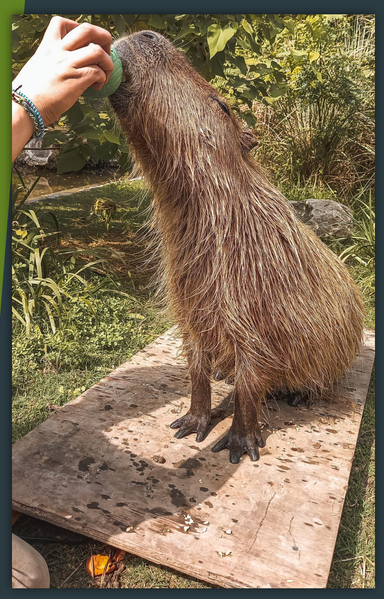
Discovery of Petting

- Petting provided comfort and relaxation, becoming a valuable secondary reinforcement.
- Close interactions revealed small lumps, leading to veterinary treatment and a comprehensive health plan.





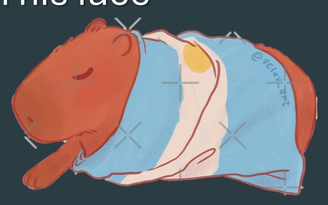
First Training Objective



- **Objective**:
  Work on target training and positioning for voluntary weighing.
- **Observation**:
  Hannibal showed curiosity and predisposition during training.
- **Veterinary Interaction**:
  Group of veterinarians began to interact with Hannibal.
  Initially, one veterinarian entered with a caregiver to create a positive association.
  Veterinarian wore a garment belonging to the caregiver for familiar scent.
- **Progress**:
  After two weeks, Hannibal showed signs of tolerance towards the vet. By the third week, Hannibal allowed the vet to touch his face and belly.

A Strong Bond

- Trust between Hannibal and caregivers grew enormously.
- Hannibal began approaching caregivers voluntarily and showed signs of relaxation.
- Voluntary blood extraction training took about six weeks, revealing liver problems.
- Training for ultrasound procedures was successful, allowing diagnosis of liver issues.



Lessons We Learned from Hannibal

- Challenging starts can lead to improved behavior and well-being, through positive bonds between caregivers and animals.
- Age is not a barrier to learning to trust.
- The importance of respect and understanding in keeper-animal relationships.
- If love had a physical form it would be that of a capybara!

The monster at the end of this story

Pittsburgh Zoo & Aquarium
Beth Inches, binches@pittsburghzoo.org

This abstract highlights the story of our female kinkajou and how we worked to help staff trust her again after she was labeled an aggressive animal.

In March of 2009, the Pittsburgh Zoo acquired a 1-year-old female Kinkajou named “Julie.” Julie did incredibly well her first year until she reached maturity in 2010. At that time, Julie became aggressive towards staff and would frequently chase the staff at the door, which often prevented staff from even entering the space. Over time, Julie had earned the reputation of “little monster.”

I tried to encourage as many staff as possible to work with her, but there was still a lot of hesitation or fear on the staff’s part. If she popped her head out of the sleeping bag just to look around, staff would assume she was going to charge. In 2015, we changed our approach for introducing new staff to Julie. New staff had to read to Julie so that she could hear their voices. This also helped to alleviate their fears about her. We also started having staff sleep in a t-shirt before they would first meet her in person. That shirt was left in with her overnight so that when she woke up, she could smell them. Today, we have successfully worked her down to just the basic handling sessions without reading or t-shirts and I am happy to say the labels are mostly gone.

the MONSTER at the end of this Story

Beth Inches
Pittsburgh Zoo & Aquarium
Animal Programs Manager
binches@pittsburghzoo.org

Julie Kinkajou arrived in Pittsburgh in 2009. She was a fantastic ambassador animal until she reached maturity. After several years of tracking her reproductive cycles and seeing how miserable she was, we spayed her but the damage was done. Several staff didn't trust her, wouldn't work with her, and she earned several unfavorable nicknames like "Little Monster." At that time, she got down to just two handlers. We worked through several methods to get staff to trust her enough to rebuild relationships with her.

METHOD

1. We started with staff just reading to her. It allowed them to be around her without any expectation of handling.
2. Julie started showing interest, and would stick her head out in a non-threatening manner.
3. Next, we would have staff sleep in an old shirt and then give it to us to hang in her enclosure overnight so that she could get used to their smell.
4. Handlers would take her into a room for playtime. New staff would sit in a room with her but not interact. Eventually this led to them taking her out and just sitting with her in her pouch.
5. If she was not reacting, staff would then have to take her out, lift her out of her pouch, and hold her.
6. Finally, staff are free to take her out, but must spend several days practicing before taking her into a classroom.

RESULTS

Julie now shows great comfort and is very accepting of new handlers. We have been able completely remove steps 1-3 and start the new introductions at step 4.

AKNOWLEDGEMENTS

Pittsburgh Zoo & Aquarium's Education and Animal Ambassador Teams

Taking the 'Snot' Out of Snot Otter

Pittsburgh Zoo & Aquarium
Shanna Gay, shannabryanne@gmail.com

Pennsylvania's state amphibian, the eastern hellbender, is an intriguing and elusive animal living in the fast-moving waterways ranging from New York to Tennessee. Hellbenders are the largest salamander in North America, and these primarily nocturnal animals spend most of the day hidden under large, flat rocks or logs. A unique defense mechanism of these wrinkly and flat bodied creatures is to secrete a thick mucus all over their body, earning them the nickname of snot otter. This thick 'snot' ensures that whatever threat that is approaching them won't be able to easily grab ahold of their body. While this is a great defense mechanism, it can make handling during exams a challenge. By using desensitization methods throughout the past five years, we have been able to ensure that our resident hellbender, 'Heather' is more comfortable with being handled. By encouraging 'Heather' to come up for tactile work and allowing her to swim out of our hands when she wanted, we slowly built a bond that allowed for acceptance to handling. This past year during her annual exam we were able to do the complete exam with minimal mucous production and less stress on 'Heather'. Over the course of the past few years, it has also been observed that 'Heather' will swim up to staff for tactile work and is resting in their hands for longer periods of time.

Taking the 'Snot' Out of Snot Otter

Shanna Gay, Aquarist | Pittsburgh Zoo & Aquarium

Pennsylvania's state amphibian, the eastern hellbender, has a unique defense mechanism to secrete a thick mucus all over their body, earning them the nickname of snot otter. While this excellent defense mechanism proves fruitful in the wild, it can make handling a challenge. By slowly introducing tactile work with our resident hellbender, Heather, we are working to desensitize her to being netted and handled for weigh-ins and exams.

Methods

Over the past five years, we have **built a bond** with our hellbender allowing for us to encourage her to come up to us for tactile work. When we initially started handling Heather she was very hesitant to come up to keeper staff and avoided the net when it was placed in the water.

As time went on, she willingly approached us and we could support her in our hands and use our fingers and non-supporting hand to run them along her body, tail, legs, and feet. She is also less apprehensive around the net, allowing us easier access to move her from her habitat.

Heather is not very food motivated making it difficult for easy rewards. Due to this

we decided in order to keep this a **positive interaction**, all tactile work performed tank side has been **Heather's choice**. We readily encourage her to swim and climb into our hands when she approaches the surface of the water and let her swim out of our hands when she has had enough.

Over time, it has been noted Heather will rest longer in our hands, allow for more manipulation of her limbs and tail, and **willingly** comes up to staff multiple times during a session. Currently she allows us to manipulate limbs specifically for various vet procedures. Because of the work we've done, the vet team is able to get clear x-rays and monitor other health conditions during her exams.

Next Steps

Exams have become much **less stressful** on our resident hellbender resulting in minimal mucus production. As Heather continues to become more comfortable with being handled, we would like to continue to desensitize her to various positions to allow for easier blood draws. We have also been working on recall training to allow for easier capture when we need to move her from exhibit.

Acknowledgments

Thank you the staff, interns, and docents at the Pittsburgh Zoo & Aquarium.

Vitamin E Supplementation in Red-tailed Hawks (Buteo jamaicensis)

African Lion Safari, Cambridge, Ontario, Canada
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Zoological facilities strive to ensure dietary needs are met for the animals in their care. In captive raptors, a common problem is vitamin E deficiency. Low levels of circulating vitamin E have been correlated with reduced egg hatchability, muscular dystrophy, and myocardial degeneration, among other ailments. Studies investigating vitamin E deficiencies in raptors have focused on improving circulating vitamin E levels by adding a supplement to the diet or by injecting a natural source of vitamin E intramuscularly. Both of these methodologies have been successful in captive raptors; however, they are not always most efficient. Adding a powdered supplement to a raptor's diet often results in loss of some supplement in the handling process and a therefore incomplete dose, and injections can be stressful for animals to endure on a routine basis. We hypothesized that more efficient supplementation could be attained by feeding a vitamin E supplement to a prey item consumed by our raptors. We assessed vitamin E in blood samples obtained monthly from red-tailed hawks (Buteo jamaicensis) fed a vitamin E enriched prey diet. We also obtained data on stored vitamin E levels from liver biopsies collected from quail at various development stages to understand how they metabolize vitamin E. Our preliminary results suggest that vitamin E enriched prey efficiently raises circulating vitamin E in red-tailed hawks.

Vitamin E Supplementation in Red-tailed Hawks (*Buteo jamaicensis*)

Mary Atkinson,[1] Dr. Jaden Dales,[3] Janel Lefebvre,[1] Dr. Drew Sauve,[1] Gareth Morgan,[2] and Dr. Amy Chabot [1]

[1] African Lion Safari, Research Department
[2] African Lion Safari, Birds Department
[3] Dales Exotic Mobile Veterinary Services

Introduction

- Proper nutrition is key for ensuring healthy animals under human care[1]
- Vitamin E deficiency, a common challenge for raptors under human care, impairs reproductive success and egg quality[2]
- Currently available methods of vitamin E supplementation are not efficient[3]
- **Does feeding a raptor's prey item a diet enriched with vitamin E improve concentrations of vitamin E in raptors under human care?**

Objective

To provide a more efficient method of increasing vitamin E intake for red-tailed hawks to improve reproductivity, hatchability, eggshell quality, beak and talon quality, and overall health.

Hypothesis & Prediction

H1) If providing red-tailed hawks with prey items that are fed a vitamin E enriched diet increases their vitamin E,

P1) then the amount of circulating vitamin E in hawks fed prey with a vitamin E enriched diet will increase over time

Methods

- Dietary vitamin E supplement added to regular quail diets
- Liver biopsies from different quail age groups to determine stored vitamin E
- Monthly blood draws from red-tailed hawks to determine circulating vitamin E (Figure 1)
- Blood is drawn from the brachial vein by our veterinarian and is submitted for CBC, biochemistry, and vitamin E levels
- Images of red-tailed hawk beaks and talons are taken prior to blood draws

Figure 1. RTH 'Aaron' has his blood drawn to determine circulating vitamin E levels

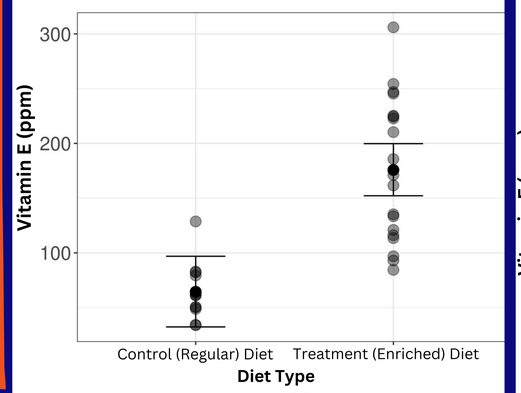

Figure 2. Vitamin E values in 32-day old coturnix quails fed control or treatment diets.

Coturnix quail show increased stored vitamin E levels following provision of a vitamin E enriched diet (Figure 2)

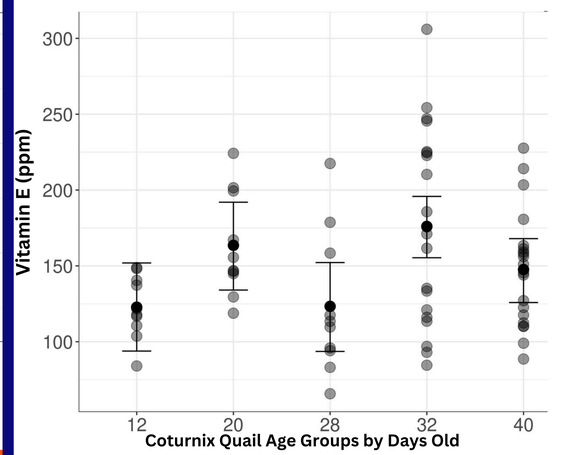

Figure 3. Vitamin E values in quail livers at different ages of growth.

Coturnix quail store and use vitamin E in a cyclic pattern, potentially in relation to growing stage (Figure 3)

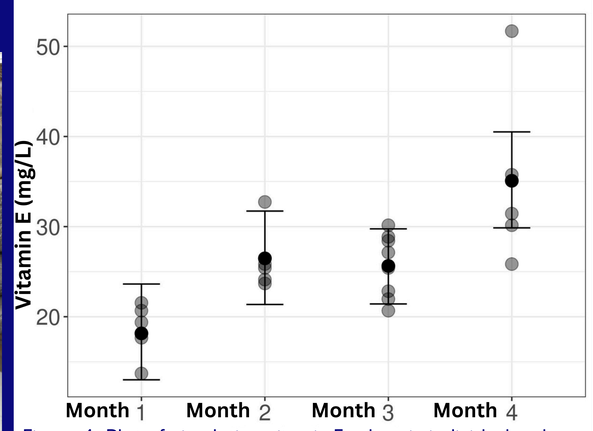

Figure 4. Plot of circulating vitamin E values in individual red-tailed hawks over the course of 4 months.

Circulating vitamin E increases over time in red-tailed hawks fed vitamin E enriched prey (Figure 4)

Figure 7. Example of beak picture collected to observe changes in quality

Figure 8. Example of talon picture collected to observe changes in quality

RTH 'Pippi' photographed to track any observable changes to quality of beak (Figure 7) and talons (Figure 8). Each hawk has their picture taken prior to blood draws.

Conclusions

- Vitamin E enriched prey increases circulating vitamin E in RTH
- Prey items store vitamin E in a cyclic pattern according to growth

Next Steps

- Using pictures of beaks and talons to quantify potential improvements in quality (Figures 7 & 8)
- Creating an ethogram to monitor potential improvements in reproductive behaviour
- Determining vitamin E degradation in frozen quail over time

ACKNOWLEDGEMENTS

Big thanks to the animal care staff, our veterinarian, and research team at African Lion Safari, for their continual support and flexibility, and for welcoming new research ideas.

REFERENCES

1. Chitty. (2008). BSAVA 2008; eds. Chitty & Lierz
2. Schink et al. (2008). Journal of Avian Medicine and Surgery 22(2):99-102.
3. Mainka et al. (1992). Journal of Zoo and Wildlife Medicine 23(1):72-76

Conflict Mitigation – Giving Cheetah a Voice

Action for Cheetahs in Kenya
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In 2020, Action for Cheetahs in Kenya launched a Conflict Mitigation Toolkit aimed at sharing the techniques used by field officers to share with rangers in other areas. After a trial period of six months, the rangers shared their comments to assist in finalizing the toolkit for publication. This poster will highlight the elements of the toolkit and the distribution plan for increasing the use of the toolkit in other regions of Kenya. Although ACK is focused on the cheetah in our research the tool kit addresses the importance of predator ID, predator behavior, and catered mitigation strategies The poster will also share results of pre- and post surveys and other mitigation strategies undertaken by ACK. Funding for this work was received from several AAZK chapters and from Bowling for Rhinos.

Human-Carnivore Conflict Mitigation Toolbox

A Guide to Investigating and Preventing Livestock Loss from Predators

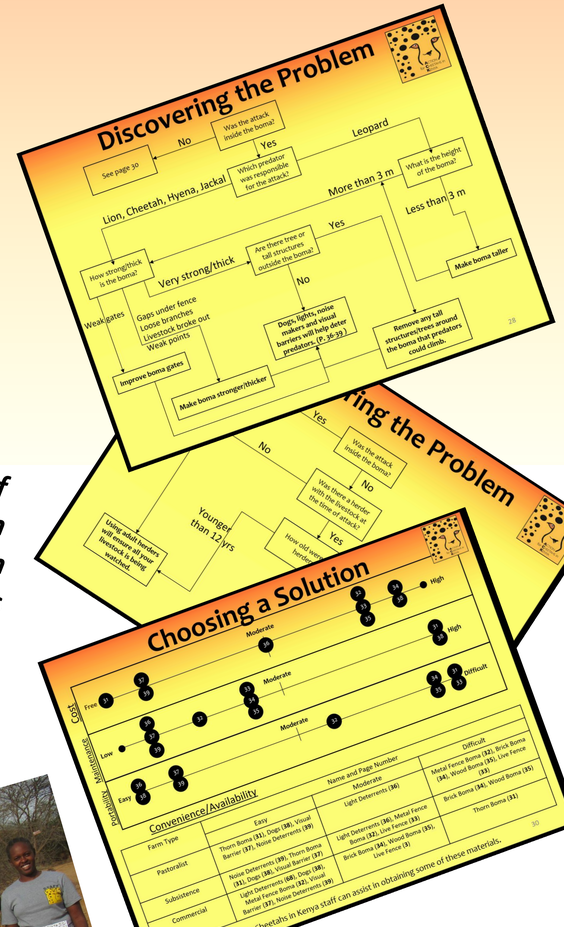
Although ACK is focused on the cheetah in our research the tool kit addresses the importance of predator ID, predator behavior, and catered mitigation strategies. ACK's Mitigation Toolkit is endorsed by the Kenya Wildlife Service Carnivore Task Force and the Laikipia, Isiolo, Samburu Large Carnivore Working Group and is being adapted for use in more than 20 conservancies!

❖ 20% of rangers could not differentiate predators from their photographs

❖ 80% of rangers could not differentiate predator tracks

The first step in finding a solution is in identifying the correct problem and understanding the animal behaviour.

1. Identify the problem: Use the Flow charts on pages **28** & **29**.
2. Choosing a solution: Follow page numbers on flow charts or use page **30**.
3. Follow the page number(s) given for solutions and information on how to implement them.
4. Recognizing that no solution will be effective without recognizing due diligence and livestock health as a first defense against livestock loss.



❖ With a high rate of illiteracy, rangers in remote areas rely on photos and diagrams to follow the process.

❖ After 6 months 78% of rangers were carrying the booklet on all conflicts

❖ 93% of the rangers shared the book with other team mates

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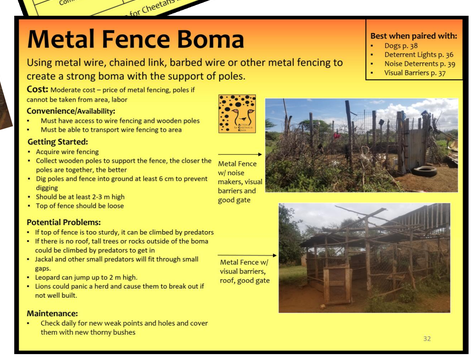

Correlating Fecal Glucocorticoid Metabolites with Reproductive Events in Omaha Henry Doorly Zoo's African Elephant Herd

Omaha's Henry Doorly Zoo & Aquarium
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One important component of welfare assessment for elephants in captive environments is the analysis of corticosteroids – "stress hormones" – present in the system. Metabolites of these hormones in the feces can allow animal staff to quantify relative stress levels of individuals noninvasively. The Reproductive Sciences endocrinology lab at Omaha's Henry Doorly Zoo & Aquarium has performed regular long-term monitoring of our herd of African savanna elephants. We have accumulated weekly fecal cortisol data for the past three years for 1.5 adult elephants. This period captures regular cycling, breeding events, pregnancy, and the birth of calves by each of our five females.

Overall, the bull experienced far fewer and less acute cortisol elevations than the females in the two years he was monitored before leaving the institution. In the females, many sharp peaks in fecal progesterone were mirrored by sharp peaks in fecal cortisol, especially at the beginning of estrus cycles. Sustained elevation of progesterone during luteal phase or pregnancy was not reflected by sustained elevated cortisol. Fecal cortisol levels in the bull showed peaks corresponding with the beginning of the luteal phase during multiple females' cycles. The bull also experienced elevations in testosterone in response to breeding events, both conceptive and non-conceptive. Each pregnant female showed varying peaks in fecal cortisol before birth, with four out of five females experiencing cortisol spikes in the final 20 days. One female experienced no elevations in cortisol in the same pre-parturition window; this female also gave birth about two weeks prematurely.

Correlating Fecal Glucocorticoid Metabolites with Reproductive Events in Omaha Henry Doorly Zoo's African Elephant Herd

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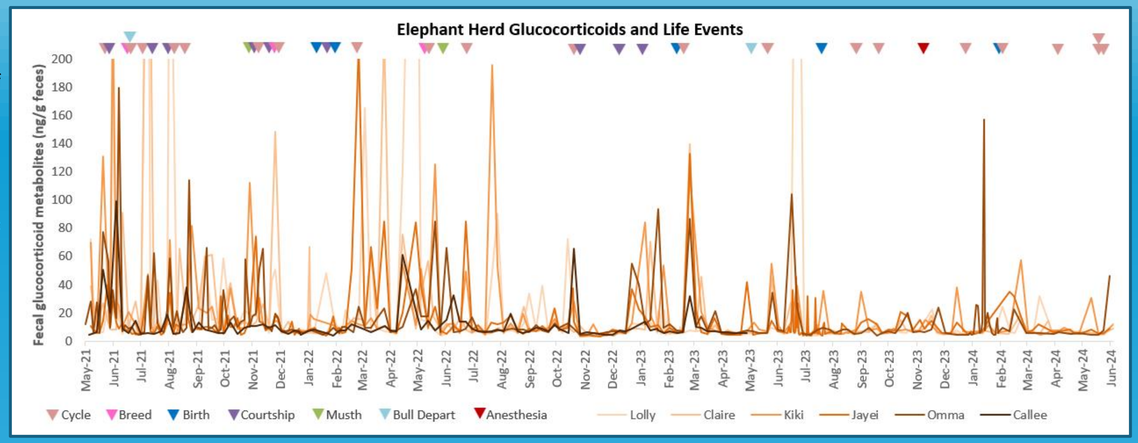
Background

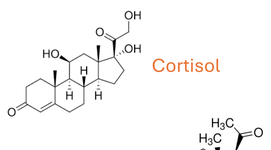
The endocrine lab at Omaha's Henry Doorly Zoo and Aquarium has generated longitudinal profiles of various stress and reproductive hormones across our elephant herd for a period of over three years using reliable, non-invasive fecal sampling. This data collection opportunity spans many reproductive and other life events, including five calf births. We are now able to combine the elephants' hormone data sets in perspective of these events and analyze what may have provoked stress hormone responses in our herd.

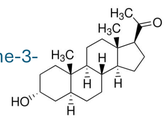
Glucocorticoids are a class of hormones which are implicated in stress response of vertebrate species. Cortisol is considered the primary stress hormone in most mammals, including elephants, and it can be measured either directly, as in serum samples, or indirectly, by analyzing biologically inactive hormone metabolites excreted in waste. Many factors can impact an elephant's experienced stress, and certain events are known to induce a measurable change in stress hormones, such as estrus cycles, birth, musth, and courtship interactions [1, 2, 3]. Animal stress response to these natural events is considered eustress ("positive" stress), as opposed to distress ("negative" stress) in response to negative events.

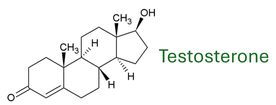


Methods

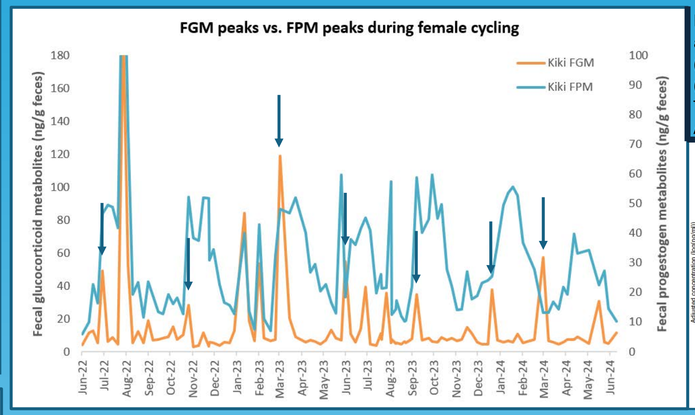
- Fecal samples collected weekly/biweekly from 1.5 adult African savanna elephants (*Loxodonta africana*) over three years; more frequent samples collected from pregnant dams before birth
  - Feces stored at -20°C until processed; some pre-birth samples processed fresh
- Hormone metabolites extracted from wet feces shaken with 80% methanol; samples centrifuged and supernatants transferred and stored at -20°C
- Fecal hormone metabolite levels analyzed in duplicate via enzyme immunoassays previously validated for elephants: Progesterone (Arbor Assays K025-H5), Cortisol (Arbor Assays K003-H5), Testosterone (Arbor Assays K032-H5)
- Microplate wells read using Molecular Devices SpectraMax ABS and results calculated using Molecular Devices SoftMax Pro 7; further data analysis using Microsoft Excel

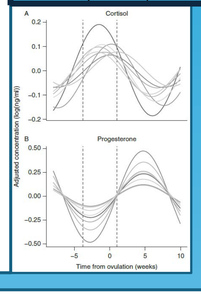






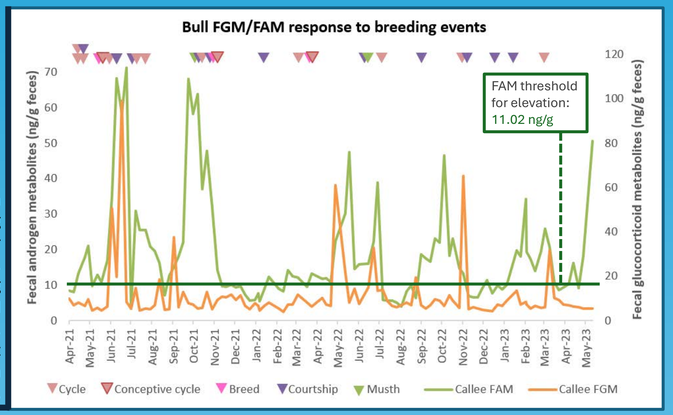
Fecal glucocorticoid metabolites (FGMs) – inactivated stress hormones excreted in feces
Fecal progestogen metabolites (FPMs) – inactivated progesterone-like hormones excreted in feces
Fecal androgen metabolites (FAMs) – inactivated testosterone-like hormones excreted in feces

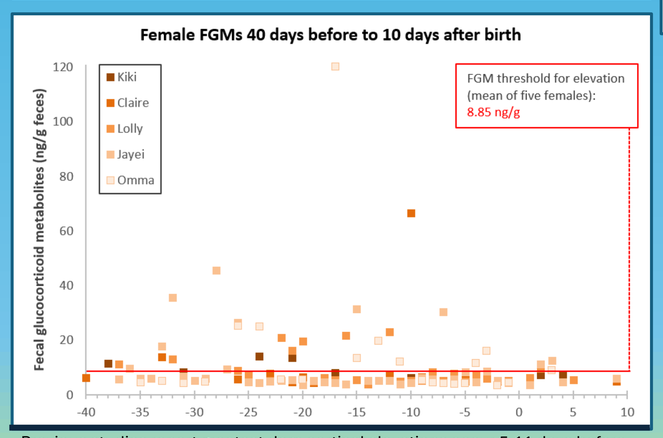




Representative cycles (n=7) from Kiki show FGM peaks (arrows) associated with estrus, especially at the end of follicular phase (preovulatory, baseline FPMs) coming into luteal phase (postovulatory, elevated FPMs).
This cyclical timing of cortisol elevations reflects similar analysis of Asian elephants (see below graph from [2]).

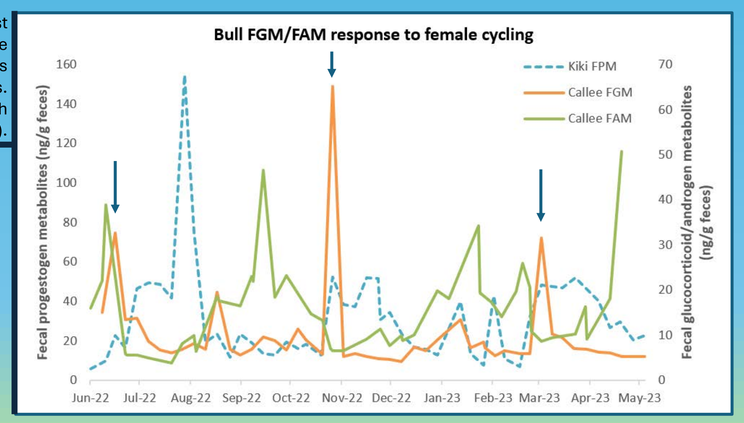
Total longitudinal FGM and FAM data available for bull Callee show strong correlation of cortisol peaks near testosterone elevations.
Prior studies report conflicting relationships between bull corticoids and androgens [1, others].
Callee showed elevated FAM during most breeding activity and during two musth bouts noted by keepers.





Previous studies report greatest dam cortisol elevations occur 5-11 days before birth [4, 5]. Only four females showed elevated FGMs during that window, but not all females had daily samples.
Kiki did not experience any elevated FGM samples for 20 days before birth (other females 2-9 days without elevations). Kiki had the shortest gestation length (621 days) and gave birth 1-2 weeks before expected.
There was generally no increased herd cortisol response after births in the samples available. Previous studies show similar findings for dams and herdmates after births [3, 5].

The bull Callee was monitored over the course of the first three post-birth cycles in Kiki before he departed the institution. Callee experienced cyclic elevations in FAMs corresponding with Kiki's follicular (preovulatory) phases. Callee also experienced sharp peaks in FGMs near each ovulatory period (arrows).



Discussion

- Don't see evidence of unhealthy FGM patterns: no extended elevation, no flatlines.
- Fecal samples are one to two days' cumulative hormones, protects against circadian cortisol rhythm.
- Cortisol likely mobilizes energy in preparation of reproductive activities
  - Hypothalamic-pituitary-adrenal (HPA) axis: suppress immune system, increase available energy stores
  - Parturition in mammals initiated by activation of fetal HPA axis
- Hormone analysis is most informative in context of other hormones and physiological data
  - ZIMS is an excellent behavioral data repository
- *Future directions:* Continue longitudinal analysis, begin calf analysis, investigate other causes for FGM responses not explained by reproductive events

Acknowledgements

The endocrine lab at Omaha's Henry Doorly Zoo and Aquarium is indebted to its volunteers for sample processing assistance. This research would not be possible without the tedious sample collection and behavioral data recorded by the Elephant care team.

References

1. Brown, J. L., Somerville, M., Riddle, H. S., Keele, M., Duer, C. K., & Freeman, E. W. (2007). Comparative endocrinology of testicular, adrenal and thyroid function in captive Asian and African elephant bulls. Gen. Comparat. Endocrinol., 151(2): 153-162.
2. Fanson, K. V., Keeley, T., & Fanson, B. G. (2014). Cyclic changes in cortisol across the estrous cycle in parous and nulliparous Asian elephants. Endocr. Connect., 3(2): 57-66.
3. Glaeser, S. S., Edwards, K. L., Wielebnowski, N., & Brown, J. L. (2020). Effects of physiological changes and social life events on adrenal glucocorticoid activity in female zoo-housed Asian elephants (Elephas maximus). PLoS One, 15(11): e0241910.
4. Kaewmanee, S., Watanabe, G., Yamamoto, Y., Yamamoto, T., Kishimoto, M., Nagaoka, K., ... & Taya, K. (2011). Updated reproductive hormonal profiles in female elephants. Thai J. Vet. Med., 41: 91-4.
5. Meyer, J.M., Walker, S.L., Freeman, E.W., Steinetz, B.G. and Brown, J.L. (2004). Species and fetal gender effects on the endocrinology of pregnancy in elephants. Gen. Comparat. Endocrinol., 138(3): 263-270.

Befriending a Flighty Pregnant Muntjac for Fetal Monitoring

Omaha's Henry Doorly Zoo & Aquarium
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Our pair of Reeve's Muntjacs are very successful breeders but have had some difficulty in the birthing process. Keepers needed to figure out a way to monitor the female in each stage of pregnancy to get ahead of any issues that may arise and allow the veterinarians to step in if needed to assist in the birth. Muntjacs are notorious for being flighty animals that are hard to train or even get close for husbandry practices. Through training, keepers at Omaha's Henry Doorly Zoo and Aquarium have been able to teach calmness and trust in our 1.1 pair. The keepers have spent many hours sitting with the female, getting her to take food from their hands, and not running away at the first sight of them. Due to this training, they have been able to do voluntary x-rays on the female to confirm pregnancies in the last several years. By working closer and building trust with the female, the keepers have also been able to assess for teat and udder development during the pregnancies and throughout the process to monitor for any problems that may arise in the months leading up to birth. This training has allowed for a more hands on approach in the last few days prior to birth when complications have previously arose, allowing the vet staff to step in to try and save mom and fetus. Out of this training, she has had 2 out of 3 successful births with another one on the way.

Befriending a Flighty Pregnant Muntjac *(Muntiacus reevesi)* for Fetal Monitoring

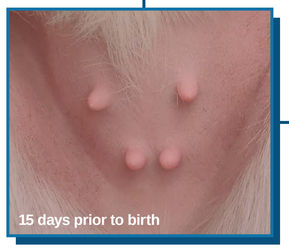
Hilary Merkwan
Omaha's Henry Doorly Zoo & Aquarium

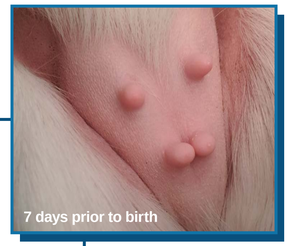
INTRODUCTION

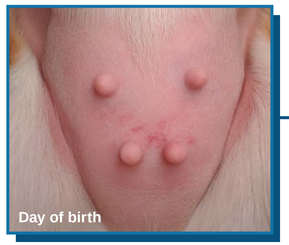
- **Keepers want to know if female muntjac is pregnant or not**
  - Need to know when to separate away from exhibit mates (male muntjac and red panda) sharing the same exhibit space
- **Brainstorming with the veterinarians took place to find best possible way to confirm pregnancy in a flighty hoofstock animal**
  - Muntjac will need to either stand still for an X-ray or take part in voluntary ultrasound

Signs of Pregnancy

- Belly becoming more pronounced and filled out
- Increase of appetite
- Increase in weight after 3-5 months of pregnancy
- 1.5 months prior to birth belly gets tight/plump around mammary glands
- 10-12 days prior to birth bagging up starts

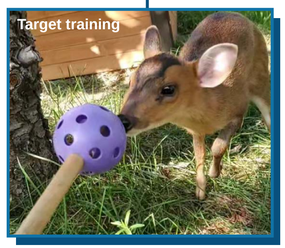

15 days prior to birth

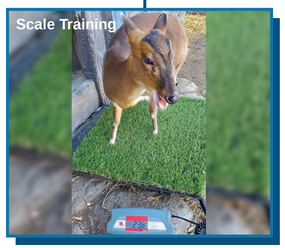

7 days prior to birth


Day of birth

TRAINING METHODS

1. **Gaining trust – Patience and calmness to let animal come up to keeper and receive rewards**
2. **Target training – touch nose to target (whiffle ball on a stick)**
3. **Scale Training**
   - Wood board on top of scale with rubber mat on turf surface
   - Step up with all four hooves onto board on scale
   - Place treats on board to lure animal on, or hand feed
4. **X-ray Training**
   - Use board from scale training to be an "X-ray plate"
   - Move animal along parallel to "X-ray plate" (eventually made an X-ray plate holder
   - Introduce arm moving with X-ray Gun prop towards belly and moving it around to simulate gun placement
5. **Assessing of Abdomen**
   - Targeting animal across keeper
   - With rewards in one hand, move other hand slowly towards belly
   - Touch under the belly for longer approximations until comfortable
   - Once comfortable, move around hand to feel teats and ledges of her udder as time progresses and it bags up


Target training

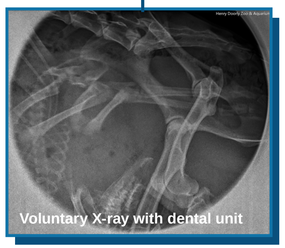

Scale Training


X-ray Training


X-ray Training

RESULTS

- **Female seemed like she was in labor (uncomfortable and straining)**
- **Vets were contacted and baby didn't come within a few hours**
- **Vets came to get a voluntary X-ray**
- **Baby was breech**
- **Female placed under anesthesia and taken to hospital to assist birth of the fawn**
- **Fawn pulled out backwards successfully**


Voluntary X-ray with dental unit


Newly birthed fawn

CONCLUSION

With the ability to train our female muntjac, we have been able to monitor the progression of her pregnancy

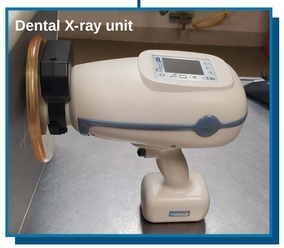
- Know when she is close to giving birth and can be separated by herself
- Able to step in when she has needed help in the birthing process

What worked

- Have patience
- No sudden movements
- Let the animal come to you
- Find their favorite rewards (whole peanuts, raisins or craisins, different fruits, mixed nuts)
- Use of a dental X-ray unit

What didn't work

- Portable large X-ray machine and gowns
- Ultrasounds – when not in labor


Dental X-ray unit


Portable large X-ray machine

Acknowledgements

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Contact Information

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