PROCEEDINGS OF THE 41ST NATIONAL CONFERENCE OF THE AMERICAN ASSOCIATION OF ZOO KEEPERS, INC.

"KEEPERS MAKING A WORLD OF DIFFERENCE"

Poster Sessions

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Using Reptile Training Tactics with Other Species

Adam Fink, Lead Keeper and Carrie Henika, Apprentice Keeper, Oakland Zoo

Introduction

Training reptiles can create challenges that often lead to the lack of conditioning with this taxa. Some of these difficulties include variable feeding schedules, limited senses, and long periods of inactivity. These challenges can be overcome with a little patience, some observation, and some research into their natural history and behavior.

Similar challenges are sometimes experienced with other taxa as well. Many of the strategies used in training reptiles can be applied towards challenges that arise in other taxa. At the Oakland Zoo, we have applied reptile training techniques to help us overcome some conditioning obstacles with a Guinea Forest Hog that became deaf. By utilizing a tactile bridge that works with our Aldabra Tortoises with the hog, we were able to continue an effective training program despite his deafness.

Reptile Training

At the Oakland Zoo, we view training with all taxa as important for husbandry management, behavioral, medical, and enrichment purposes. Reptiles do pose some challenges compared to other taxa. We have training programs with Aldabra Tortoise (*Aldabrachelys gigantea*), Sulcata Tortoise *(Centrochelys sulcata)*, American Alligator *(Alligator mississippiensis)*, Black-Throated Monitor *(Varanus albigularis ionidesi)*, and Black Tree Monitor *(Varanus beccarii)*. Most of these species are target trained and each has species-specific behaviors as well.

Scan for a video of tortoise and alligator training.*

Keeper Leslie Storer target training and scale training Hogan the Black-Throated Monitor

Target training and name recognition with Bismarck the American Alligator. We use the Alligator's name as a cue for the behavior. It allows us to train 4 Alligators at the same time with less interference.

Aldabra Tortoise Training

There are several challenges involved with training our 3.3 Aldabra Tortoises. The biggest challenge with them when it comes to traditional training techniques is their limited hearing. This makes verbal cues and auditory bridges not as successful as it is with other taxa. To overcome this, we use a visual or tactile cue, depending on the behavior, and a tactile bridge consisting of a double tap on the shell. With these techniques, we have been able to target train all three of our males as well as train an open mouth behavior on one of the males and a nail trim behavior on two of them. We have now started target training with our three females using the same techniques.

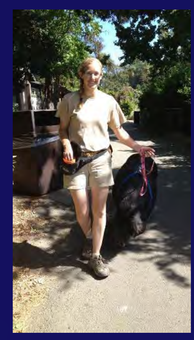
Adam cueing OJ, the Aldabra Tortoise for the open mouth behavior.

Gus, the Aldabra Tortoise targeting.

Pig Training

Our 1.1 Guinea Forest Hogs *(Sus scrofa domesticus)* have been trained to walk on harness and leash by trained keepers, apprentice keepers and interns for public interactions at the Oakland Zoo. The bridge used is a clicker and the reinforcements are fruits, veggies and horse cookies.

Jason and Sarah, the Guinea Forest Hogs at the Oakland Zoo. These are a rare breed of domestic pig.



Carrie walking Jason the pig through the zoo.

Applying Tortoise Training to the Pigs

In Fall 2013, it became clear that our male Guinea Forest Hog, Jason, was losing his hearing. Walks with him were not going as smoothly as they had previously, and Jason often seemed startled when receiving his reinforcement, as if he hadn't heard the bridge and wasn't expecting the food to be delivered. We began to think about a more suitable, non-auditory bridge for him. We considered a visual bridge at first, but decided against it since the pigs often have their face looking down during a walk. We decided to use the same bridge we use for training our Aldabra tortoises, a tactile bridge consisting of two pats with my hand on the upper back. We felt that the double tap would be different enough to distinguish it from being pet, as zoo guests are allowed to pet the pigs while they are out for public presentations. Previously the cue for having Jason begin to walk again during a session was a verbal "Let's walk". We switched this to a big pointing forward motion so that Jason could clearly see the cue.

Tortoise visual cue for "open mouth".

Pig visual cue to replace "let's walk"

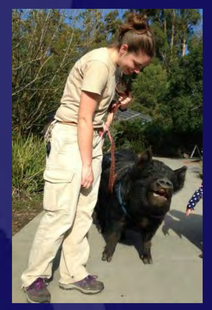
Tortoise tactile bridge for "target" behavior.

Pig tactile bridge.

Results

During the first session using the tactile bridge Jason showed remarkable improvement. When bridged, he slows down the pace of his walking and looks up for his reinforcement. His walks have improved, as well as his interactions with the public. Jason is now receiving a clear message of exactly when he's being reinforced so that we can take further steps with his training. The bridge has been transferred to other keepers as well.

Carrie walking Jason the pig and interacting with the public



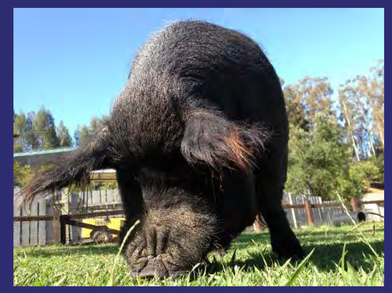
Other keepers, such as Rachel, also walk Jason with the tactile bridge.

Scan for a video of pig walking with a tactile bridge.*

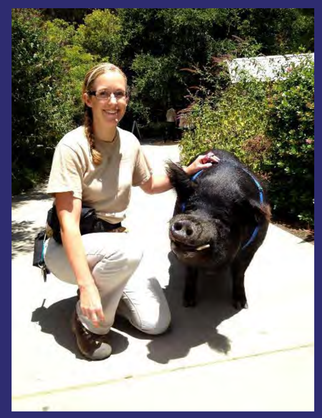
Carrie reinforcing Jason the pig as he is being pet by the public

Conclusion

Challenging situations come up often when training animals in a zoo setting. As keepers, we look for solutions to problems wherever we can to provide the best care for our animals. In the situation with Jason the pig,. we took inspiration from another species, the tortoises, who are faced with a very similar training challenge. By applying the tactics learned training the tortoises, we were able to continue the training program with Jason which is rewarding for him, his trainers, and the public.



Jason grazing in his exhibit.



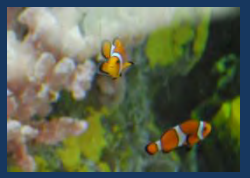
Carrie and Jason out on a walk

Acknowledgements

Thank you to Elizabeth Abram, the primary pig keeper; Zoo Managers Margaret Rousser and Darren Minier; and the rest of the Children's Zoo staff.

* To view the videos, scan the QR codes with any QR Code Reader App on any smart phone or tablet.

Beyond the Barnyard: A New Species of Children's Zoo



KidZooU: The Hamilton Family Children's Zoo and Faris Family Education Center at the Philadelphia Zoo Creates a New Environment to Engage Children and Teach Wildlife Conservation

Animal Training Demonstrations: Recycling is So Easy a Rat Can Do it!

The goals of our demonstrations are to create empathy for animals, show animals as role models displaying behaviors that conserve energy and to offer new perspectives on familiar animals.

- **Rat Demonstration:** Our rats show off their natural agility and flexibility by running across a rope 7 feet off the ground and finding their way through a maze. By training more complex behaviors, such as putting recycling and trash items in the appropriate bins, our rats show their focus and intelligence. This demonstration compliments our rat colony exhibit which has agility course elements and messaging telling guests that rats are "Entertaining," "Clever," and "Affectionate." This also allows us to recommend them as pets and discuss wise and unwise pet choices with the public.
- **Goat Demonstration**: Our goats encourage guests to relate to and empathize with them by running, jumping and spinning through an agility course. The goats get to show off their individual personalities and children get to participate by standing as weave poles for the goats to navigate through. One of the goats also wears a backpack to highlight their domestication as pack animals.
- **Pigeon Demonstration**: Our pigeon loft exhibit showcases many unique breeds including a flock of homing pigeons who take part in the daily demonstration. On a cue from the audience the birds are released from a crate at one of various locations around KidZooU. The flock circles overhead in and out of sight while the presenter tells the audience interesting and surprising facts about pigeons. When the birds return to the loft the children count with the keeper to make sure they have all gone through the bob door. The keeper then brings out an ambassador pigeon who flies around the loft and lands on a selected child's hand. Guests are always surprised to see how beautiful and intelligent the pigeons are, especially in a city where they are mostly viewed as pests.

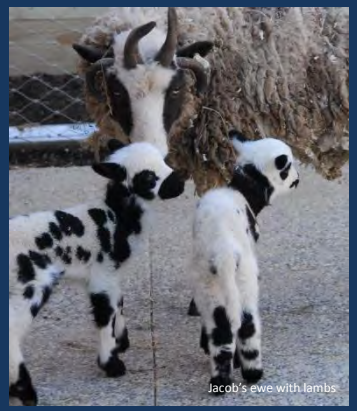
Animal Welfare: Why the Keepers Love it.

Moving to an updated facility and consolidating our Program Animal Collection has allowed keepers to implement a higher standard of animal care and enhance the existing volunteer and intern programs.

Joining more closely the Education Department and the KidZooU keeper staff has also improved our ability to develop more exciting educational programs and continue our mission to have all animal ambassadors choose to participate in programs voluntarily.

Educators and trainers work together to shape and maintain conservation-related behaviors that are evoked during programs such as a chicken turning off a light or a macaw recycling. Training these behaviors is not only beneficial to the welfare of the animals, it is also an impressive means of delivering our conservation message to a wider audience.

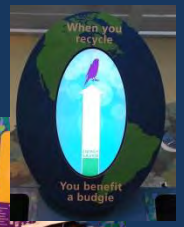
The welfare of our non-program animals was also greatly improved with the new facility. One of the goals of the KidZooU collection plan is to propagate rare breeds of domesticated animals. Through this project we have developed a very unique collection of sheep and goats which enables us to highlight the importance of species diversity. Some of our sheep and goats rotate through our contact yard and others are given the opportunity to utilize our bridge, raceway and climbing tower. The climbing tower is paired with a similar children's version so that they may engage in "parallel play." This is designed to encourage empathy towards animals as the children see that they play in the same way as our goats.

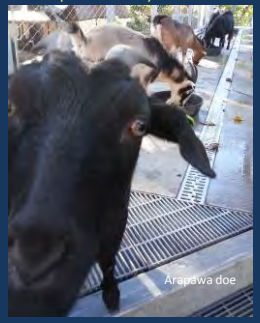


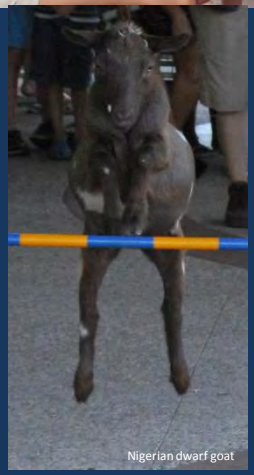
Sheep and Goat Contact Yard: Not Just a Petting Zoo.

In order to more closely monitor the health of our animals, the KidZooU contact yard does not offer the opportunity to feed the animals as traditional petting zoos do. Instead, the focus is on teaching guests to interact with animals in a caring, positive manner. This is accomplished by staff who instruct guests on the proper way to pet the sheep and goats and how to groom their coats with the brushes available in the yard.

All of the animals went through desensitization training for months before the exhibit opened. This training was geared toward having animals in the yard who would react calmly to guests with special needs. Placing emphasis on this training has allowed us to welcome guests with mobility equipment such as wheelchairs or crutches and those accompanied by service dogs. Outside of the contact yard there is also a free-ranging colony of rare breed chickens who are handfed portions of their diet by guests and keepers once a day.







INTERACTIVE EXHIBIT DESIGN: Why the Kids Love it.

Several KidZooU exhibits include interactive components to reinforce the overall message "Saving Energy Saves Wildlife." For example, the budgie exhibit is paired with a recycling truck activity where children race to score points by choosing recyclable items and moving them up a conveyer belt into a recycling truck. This demonstrates how recycling household items saves energy, which helps save budgies in the wild.

Other activities children can explore inside the building encourage them to conserve water and electricity in their homes. Each interactive shows the connections between saving energy at home, reducing greenhouse gases in the environment and saving rainforest species, polar bears and coral reefs.

Signage throughout KidZooU includes basic animal information and also picture symbols for guests on the autism spectrum, Braille, ASL and QR codes that will show the sign in different languages. By creating an exciting and inclusive experience for all guests to enjoy, KidZooU hopes to influence every child's everyday behavior and encourage a sense of environmental stewardship.

LEED-ing by Example: Greener Pastures.

The KidZooU exhibit is housed in the Zoo's former Pachyderm House. The builders and architects were tasked with putting our conservation message into action during the renovation. Among many other sustainable features the resulting exhibit includes: three green roofs, recycled glass as part of the pathway pavement, rainwater harvesting cisterns for restrooms, geothermal climate control and natural lighting replaces electric wherever possible. This dedication and mindfulness allowed the building to achieve LEED Gold certification in 2013.

Authors: Eileen Duffy Roberts; Keeper, KidZooU and Amanda Egen; Lead Keeper, KidZooU.

Becoming a Tiger

Social Behaviors of Amur Tigers

Amanda Westerlund – Pittsburgh Zoo & PPG Aquarium

PITTSBURGH ZOO & PPG AQUARIUM

Toma - Mother

Max – 1.0 cub

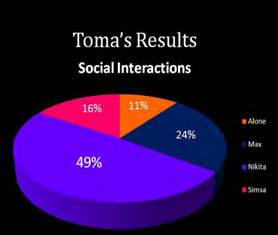
Nikita – 0.1 cub

Simsa – 0.1 cub
3 months handreared

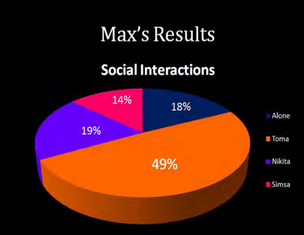
Goal: Create a time budget for each cat to see who interacts with whom, location , and what behaviors. Ten "alone" behaviors and eleven "social" behaviors were recorded. These included sitting, laying down, running, chewing, chuffing, sleeping, watching, walking, and playing and grooming. The family was observed for 18 months at least twice a week for 30-60 minute time frames.

Results:

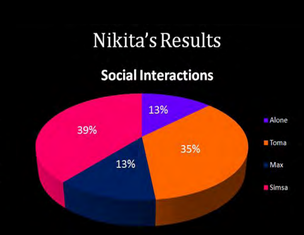
Toma's Results



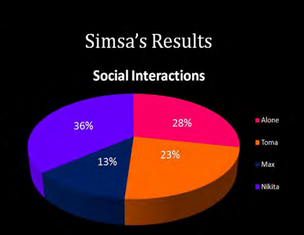
Max's Results



Nikita's Results



Simsa's Results



Discussion: Toma preferred to interact with Nikita and played with her cubs. She however was typically the target of the stalking cubs. Max liked to interact with his mother the most, along with lying around. He chuffed not once . Nikita interacted with Toma and Simsa the most. She also liked to stalk and play most of her time. Simsa had a well rounded interaction with her family, but also allowed time for herself. She also was an active cat, always on the move.

Acknowledgements:

Mark McDonough – Carnivore Keeper, Pittsburgh Zoo & PPG Aquarium
Dr. Lisa Ludvico – Professor, Duquesne University

REBUILDING OUR ANIMAL AMBASSADOR PROGRAM

Amber Henderson
Interpretive Biologist
The Rainforest at Moody Gardens
Galveston, Texas

Abstract: Hurricane Ike struck Galveston Island, Texas, home of The Aquarium and Rainforest at Moody Gardens. The storm caused major damage to the facility, which resulted in a long-term animal evacuation to other zoological facilities during the renovation and rebuilding process. This afforded the opportunity to re-evaluate the existing animal ambassador program, and expand on the steps taken to create a cohesive, workable program. This included the need to develop a program animal calendar; updating policies to be consistent with current AZA guidelines; training new staff and evaluating the current animal collection to ascertain their suitability for program use. All of these steps depended on forging a close working relationship between the animal care team and the education team.

Long term goals
-Propose a new job position within education department that will increase number of experienced animal handlers
- Find a way to overcome current policy shortcomings that is optimal for both curatorial and education department needs.

Prior to storm
- Informal 2 hour animal handling demonstration.
- No program animal schedule naturalist to pick animals day of program.
- Education and curatorial staff allowed to utilize mammals during programs.
- Education staff able to take animals off property.

Current policies and procedures
- Must go through 4 animal handling courses each one is followed by a written and demonstration exam and increases in difficulty with each course.
- Program animal calendar that is made a month in advance and ensures animals are used equally.
- Only curatorial staff can handle mammals during education programs and a curatorial staff member must be present when animals are utilized for any off property event.

Acknowledgements
I would like to thank Paula Kolvig Assistant Curator of the Rainforest, Greg Whittaker Animal Husbandry Manager, Jennifer Lamm Education Curator and the entire education department.

MOODY GARDENS
GALVESTON ISLAND

Branching Enrichment:
Connecting People and Enrichment with an Enrichment Tree

by Amy Seadler Keeper II

Louisville Zoo

Amy.Seadler@louisvilleky.gov

amyxmuljo@aol.com

ABSTRACT

In 2012, the Louisville Zoo AAZK chapter wanted to reestablish the use of an enrichment tree to assist in providing enrichment items for the animal collection during the holiday season. The tree concept is similar to the Angel Tree that is set up in malls during the Holiday season. Setting the tree up is straight forward, and time is spent mostly on figuring out what items to ask for. Getting the public involved in enriching their zoo animals is the main goal of the enrichment tree. This program allows the keeper staff, other zoo staff and the visitors to contribute to animal enrichment. Also, with tightening zoo finances, the enrichment tree enables the keepers to get items that otherwise may be difficult to obtain. A few bumps occurred the first year, and those glitches were fixed to make the tree more successful the next year. No matter how small the overall contribution, or what needs to be fixed along the way, the enrichment tree is a success for the animals, visitors, all keeper staffW and the Louisville AAZK chapter.

IDEA GATHERING

- Print paw prints.
- Make copies of the paw prints.
- Distribute paw prints to animal areas.
- Have keepers fill out prints.

GETTING THE WORD OUT

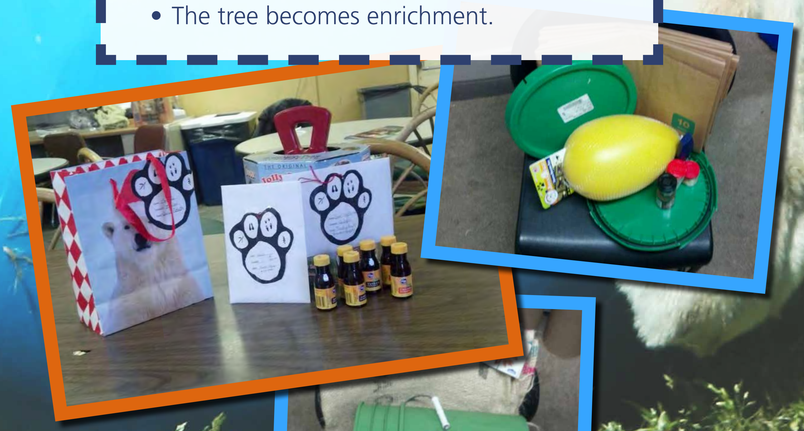
- Make information poster.
- Place poster by tree.
- Contact public relations department.

DECORATING

- Obtain a tree.
- Set tree up in a visual, public spot.
- Gather paw prints.
- Turn prints into ornaments.
- Place paws on tree.

GIFT GIVING

- Gather gifts from central drop off location.
- Make note of gifts received.
- Distribute gifts to appropriate areas.
- The tree becomes enrichment.



LET THE FUN BEGIN!!

MAKE THINGS BETTER

- Be more specific on item descriptions.
- Follow up with gift givers.
- Paw print lamination.

Thank you to Adam Campbell, Angie Cox, Cindy Froman, Jessie Grizzle, Robert Kemnitz, Joanne Luyster and Tyler Murphy for their help with construction, editing, and visual components.

Photos courtesy of Adam Campbell, Angie Cox, Alexis Dufilho Williamson, Cindy Froman, Jessie Grizzle and the Louisville Zoo.

theZOO LOUISVILLE

Target Training: Foals Don't Horse Around

A.M. Adkin, T.L. Hansen, and L.K. Warren
University of Florida, Gainesville, FL 32611

INTRODUCTION

- Training programs that utilize operant conditioning with positive reinforcement can make a world of difference in monitoring the health of captive animals.
- Building a positive relationship with an animal through operant conditioning can improve husbandry, ease medical procedures, and reduce transportation stress.
- Although the use of operant conditioning techniques on young animals has been reported in chicks, rodents, and infants, there are limited reports of operant conditioning programs involving young ungulate animals.
- ***OBJECTIVE:*** to quantify the rate at which domestic pre-weaning foals progress through a series of operant conditioning tasks and test their memory recall ability four months later.

ANIMALS AND DIETS

- 20 foals; stock-horse breed
  - **Pre-weaning** (n=20); 56 ± 2 days of age
  - **Post-weaning** (n=20) 185 ± 2 days of age
- Pre-weaning foals and dams were housed together in a 32 ha pasture. Post-weaning foals were housed together in a 16 ha pasture.
- Pre-weaning foals had exposure to dams' diet, consisting of *ad libitum* Coastal bermudagrass hay and mixed bahiagrass pasture, along with grain concentrate fed individually at 1 – 2% of mare's body weight (BW) during lactation.
- Post-weaning foals were individually fed grain concentrate at 1 – 1.5% BW and had *ad libitum* access to mixed bahiagrass pasture.

Pre-weaning target training "target straight"

Pre-weaning target training 'target up'

Pre-weaning target training "target with novel person"

PRE-WEANING TRAINING

- Sessions occurred inside 3.5 m x 3.5 m outdoor feeding pens within the pasture; foals' dams were present.
- Training divided into 3 consecutive phases:
  - ***1) Habituation***; 5-min sessions scored according to criteria (Table 1).
  - ***2) Bridge paring***; 6 daily sessions with 10 clicks per session, paired with scratching foal on shoulder.
  - ***3) Target training testing***; foals must touch target buoy with their nose.
    - Conducted over 5 consecutive days
    - 2 sessions/day for < 10 min each
    - 10 cues/session
    - Reinforcement = scratching
    - Each cue response was scored (Table 1)
    - 8 levels (Table 2)
    - 5 consecutive perfect (0) scores required to move to next level

POST-WEANING TRAINING

- Utilized foals previously trained to touch target at 56 d of age.
- A novel trainer performed tests.
- Evaluation and training was divided into 4 consecutive phases:
  - ***1) Memory testing***; recall of 8 levels of target tasks from pre-weaning testing.
  - ***2) Moving A to B***; foals go from one point to the next.
  - ***3) New location***; target training in an open (pasture) environment.
  - ***4) Trailer loading***; including target follow, cross over a rubber mat, cross over a wooden bridge, and walk into trailer.
- 6 consecutive days of testing
- 2 sessions/day
- 10 cues/session
- Each cue response was scored (Table 1).
- For phases 2-4, foal must score perfect (0) five times per session to move to next phase

STATISTICAL ANALYSIS

- All score data were analyzed using the GENMOD generalized linear model (SAS, v9.2) with a zero inflated Poisson model.
  - Binomial logit
  - Poisson distribution
- Memory recall data (response time) were analyzed using a Two-Tailed T-Test or Wilcoxson Ranked Sum (R, v2.13).

TABLE 1: Scoring system and description for pre- and post-weaning target training evaluation

Score	Score Description
4	Reacts negatively by taking multiple steps (> 2) away from trainer and/or shows signs of being extremely upset
3	Reacts negatively by taking 1-2 steps away from trainer and/or stands stationary, showing signs of being slightly nervous (pawing, shaking, looking away from trainer)
2	Reacts neutrally by standing still, ignoring and/or not making any effort to move toward target (no steps taken)
1	Reacts positively by moving head towards trainer (no steps), and/or took 1 or more steps towards trainer; trainer may touch/scratch (pre-weaning habituation), or foal's nose comes close to target 5 sec after being cued (pre-weaning target training testing, and post-weaning testing), but foal terminates interaction
0 (Perfect)	Reacts positively, readily moves towards trainer and allows trainer touch/scratch (habituation; phase 1) or readily touches target buoy within 1-5 sec after being cued (pre-weaning target training testing, and post-weaning testing), and trainer terminates scratching

TABLE 2: Pre-weaning target training levels and task descriptions

Level	Task	Task Description*
1	Target straight	Target buoy is placed 0.15 m inside feeding pen and held 1.1 m above ground
2	Target right	Target buoy is placed 0.75 m inside feed pen and 0.75 m from foal's left shoulder
3	Target left	Target buoy is placed 0.75 m inside feed pen and 0.75 m from foal's right shoulder
4	Target up	Target buoy is placed over the top fence post and 0.45 m directly above foal's nose
5	Target down	Target buoy is placed 0.15 m inside the feeding pen on the ground
6	Target random	Target buoy is placed in one of the level 1 – 5 locations in random order
7	Target follow	Target buoy is placed 1.5 m above ground, 3.5 m from the foal, requiring the foal to take multiple steps to touch target
8	Target with novel person	Target buoy is placed in the Level 1 – 7 locations by a novel person

** Trainer stationed in front of pen; foal must touch target buoy with his/her nose in all target levels (see pictures at left).*

TABLE 3: Phase completion for foals

Task	Completion (%)	Mean Number of Sessions to Completion
Pre-weaning		
Phase 3 – Target Training (all 8 levels)	100 %	10
Post-weaning		
Phase 1 – Memory Test	100 %	1
Phase 2 – A to B	100 %	1
Phase 3 – New Location	100 %	1
Phase 4 – Trailer Loading	44.4 %	4

KEY RESULTS

- Young foals readily learned operant conditioning behaviors in a short period of time.
- Sex of the foal influenced **pre-weaning** target training (Figure 1), but not post-weaning responses.
- Memory recall of target training was high. **Post-weaning** foals responded quicker on the 2nd session of memory testing (Figure 2).
- Foals completed most phases of training (Table 3).
- Target training was effective to train some weanlings to load into a trailer in a short period of time.

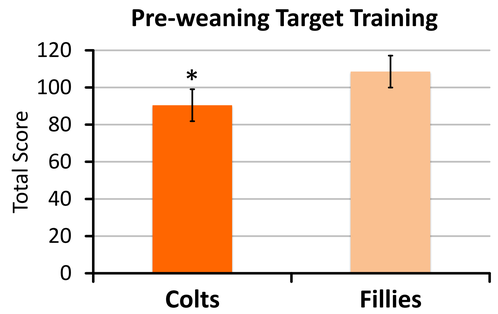


FIGURE 1: Effect of foal sex on Pre-weaning target training scores (all 8 levels combined). **A lower score reflects better performance (P = 0.007; derived from zero inflated poisson model)*

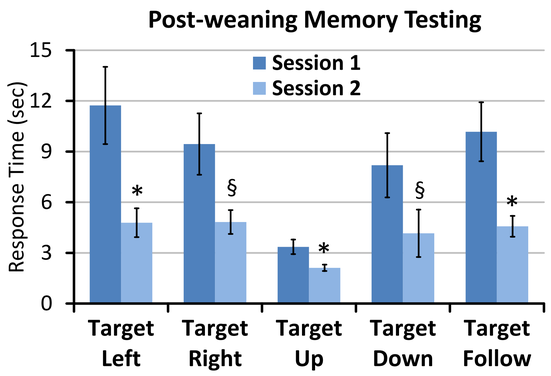


FIGURE 2: Mean response time for each behavior during two sessions of memory testing in post-weaning foals. **Session response time differs (P < 0.05); §Trend for sessions to differ (P < 0.1)*

Post-weaning target training "crossing a wooden bridge"

Post-weaning target training "trailer loading"

Tree Kangaroo Joey Developmental Milestones Data Collection

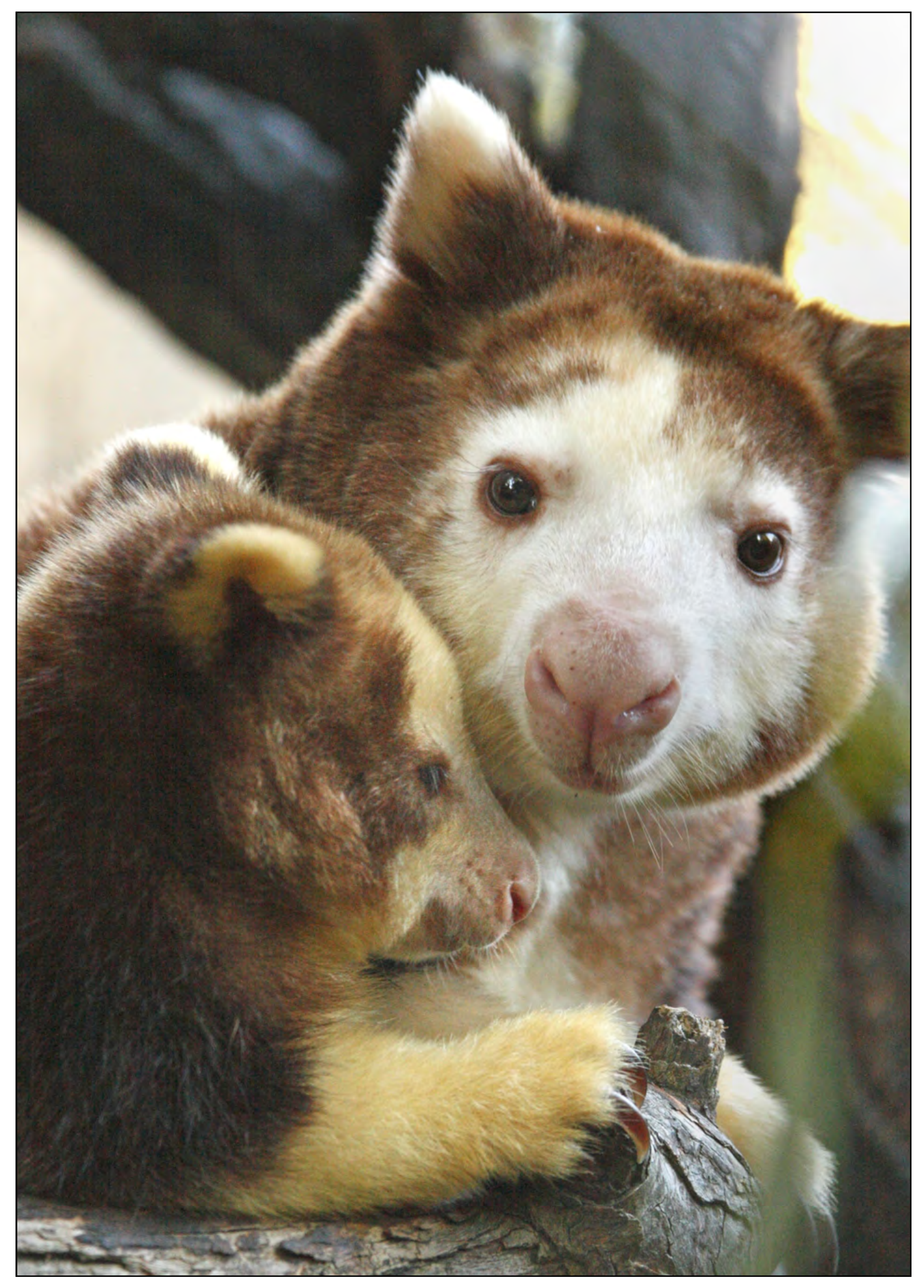
WOODLAND PARK ZOO

Beth Carlyle-Askew, Lead Keeper

Deanna Ramirez, Collection Manager

Woodland Park Zoo

Seattle, Washington



Dennis Dow/Woodland Park Zoo

The Original

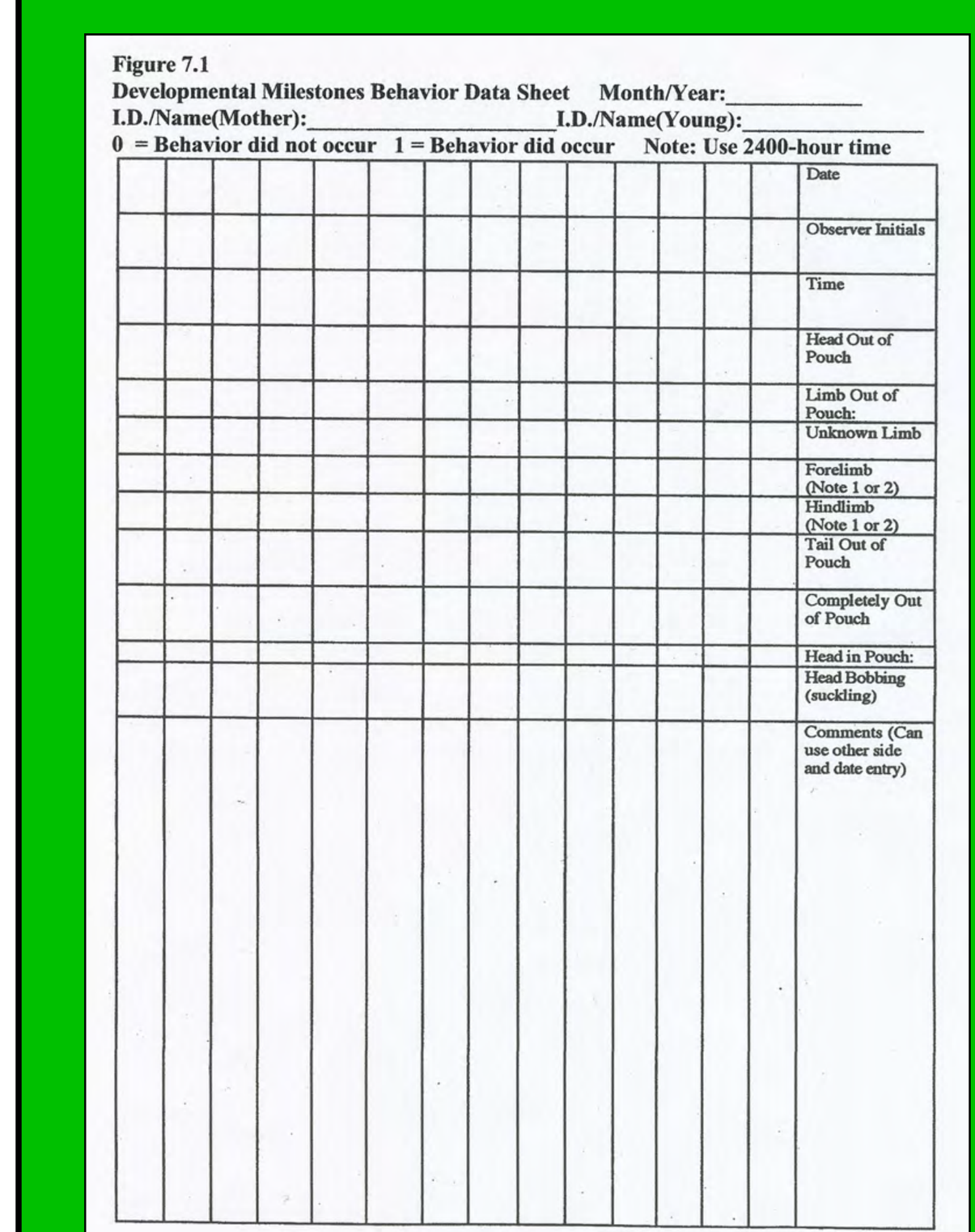
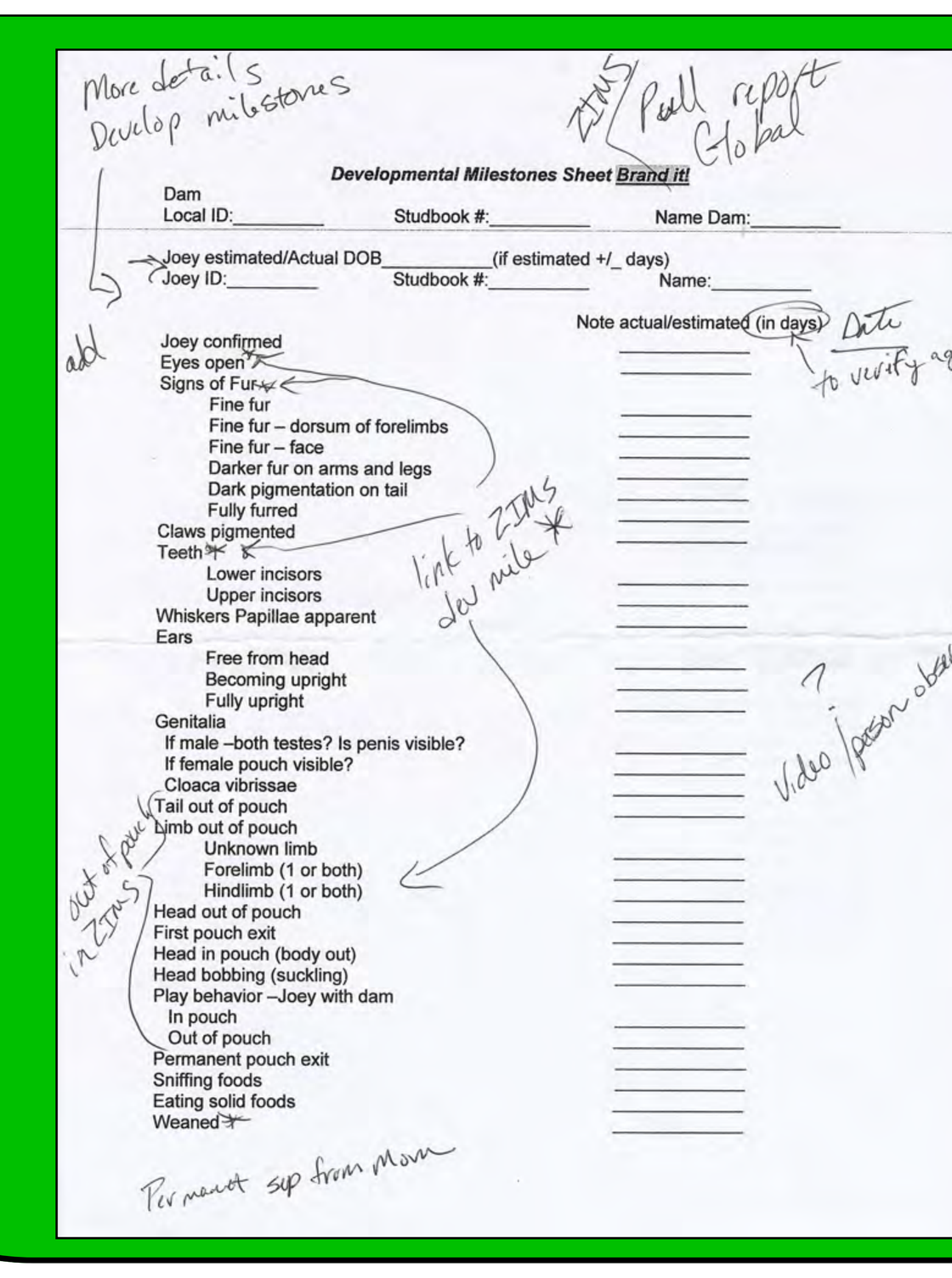


Figure 7.1
Developmental Milestones Behavior Data Sheet Month/Year:____________
I.D./Name(Mother):______________________I.D./Name(Young):____________
0 = Behavior did not occur 1 = Behavior did occur Note: Use 2400-hour time

Date
Observer Initials
Time
Head Out of Pouch
Limb Out of Pouch: Unknown Limb
Forelimb (Note 1 or 2)
Hindlimb (Note 1 or 2)
Tail Out of Pouch
Completely Out of Pouch
Head in Pouch: Head Bobbing (suckling)
Comments (Can use other side and date entry)

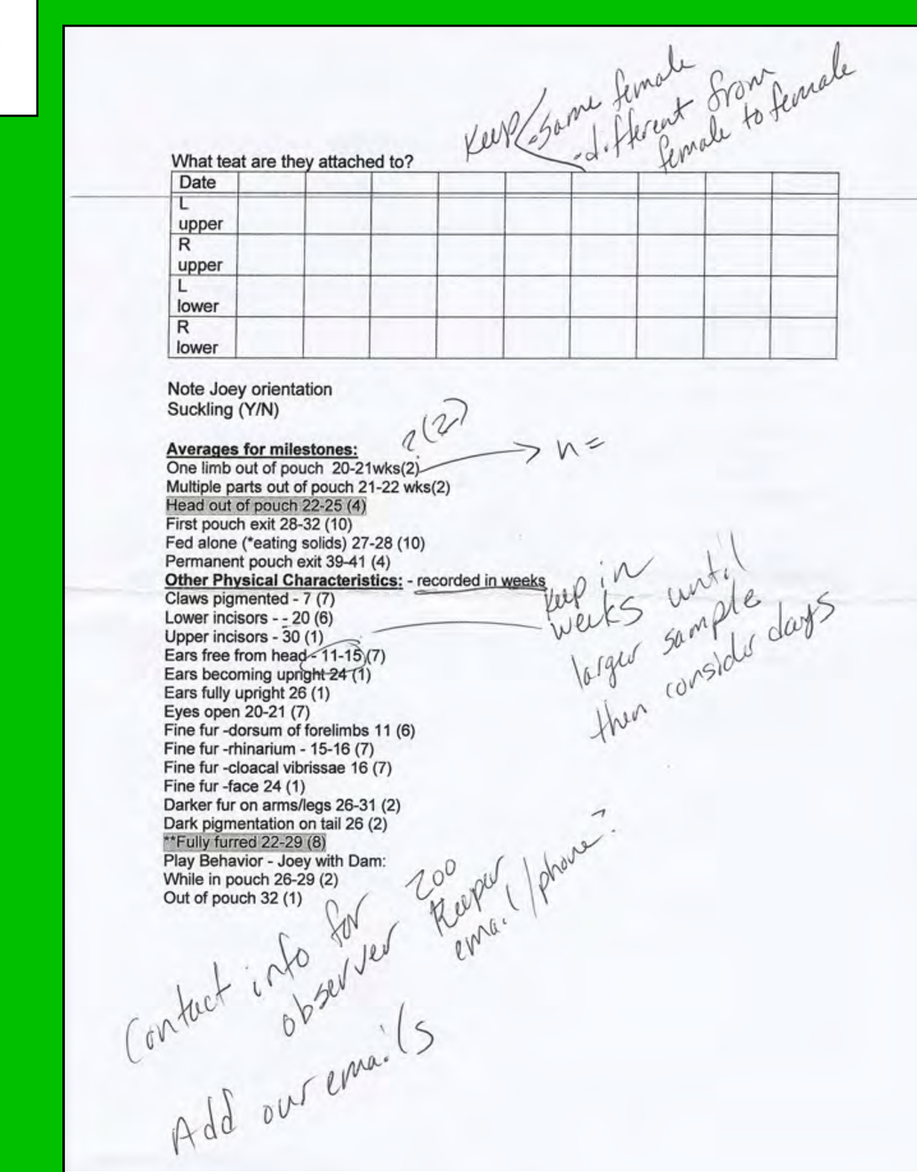
- Lisa Dabek's original data sheet while working on her master's thesis
- Milestones began once the feature was visible outside of the pouch
- Pouch check and the use of video monitoring, allowed for visualizing earlier milestones
- Simpler way to see when the first occurrence was observed
- Needed to reference the joey's record to calculate age

Reviewing the Drafts



Developmental Milestones Sheet Brand it!
Dam Local ID:________ Studbook #:________ Name Dam:________
Joey estimated/Actual DOB________(if estimated +/_ days)
Joey ID:________ Studbook #:________ Name:________
Note actual/estimated (in days)

Joey confirmed
Eyes open
Signs of Fur
Fine fur
Fine fur – dorsum of forelimbs
Fine fur – face
Darker fur on arms and legs
Dark pigmentation on tail
Fully furred
Claws pigmented
Teeth
Lower incisors
Upper incisors
Whiskers Papillae apparent
Ears
Free from head
Becoming upright
Fully upright
Genitalia
If male –both testes? Is penis visible?
If female pouch visible?
Cloaca vibrissae
Tail out of pouch
Limb out of pouch
Unknown limb
Forelimb (1 or both)
Hindlimb (1 or both)
Head out of pouch
First pouch exit
Head in pouch (body out)
Head bobbing (suckling)
Play behavior –Joey with dam
In pouch
Out of pouch
Permanent pouch exit
Sniffing foods
Eating solid foods
Weaned



What teat are they attached to?
Date
L upper
R upper
L lower
R lower

Note Joey orientation
Suckling (Y/N)

Averages for milestones:
One limb out of pouch 20-21wks(2)
Multiple parts out of pouch 21-22 wks(2)
Head out of pouch 22-25 (4)
First pouch exit 28-32 (10)
Fed alone (*eating solids) 27-28 (10)
Permanent pouch exit 39-41 (4)
Other Physical Characteristics: - recorded in weeks
Claws pigmented - 7 (7)
Lower incisors - - 20 (6)
Upper incisors - 30 (1)
Ears free from head - 11-15 (7)
Ears becoming upright 24 (1)
Ears fully upright 26 (1)
Eyes open 20-21 (7)
Fine fur -dorsum of forelimbs 11 (6)
Fine fur -rhinarium - 15-16 (7)
Fine fur -cloacal vibrissae 16 (7)
Fine fur -face 24 (1)
Darker fur on arms/legs 26-31 (2)
Dark pigmentation on tail 26 (2)
**Fully furred 22-29 (8)
Play Behavior - Joey with Dam:
While in pouch 26-29 (2)
Out of pouch 32 (1)

Feedback from TK-SSP's tree kangaroo workshops

Going Global

Beth Carlyle-Askew

Discussed using for additional species of tree kangaroos at the International Tree Kangaroo Workshop at Zoos Victoria in Melbourne, Australia in 2013

- Goodfellows Tree Kangaroo (*Dendrolagus goodfellowi)*
- Lumholtz Tree Kangaroo (*Dendrolagus lumholtzi)*

Collecting the Data

Developmental Milestones Daily Behavior Data Sheet

ID/Name Mother: ID/Name Young: Institution:

0 = Behavior did not occur 1 = Behavior did occur

Date						
Time						
Observers Initials						
Tail out of pouch						
Limb out of pouch						
Unknown limb						
Forelimb (1 or both)						
Hindlimb (1or both)						
Head out of pouch						
completely out of pouch						
Head in pouch (body out)						
Head bobbing (suckling)						
Play behavior						
Sniffing foods						
Eating solid foods						
comments:						
Date						
Time						
Observers Initials						
Tail out of pouch						
Limb out of pouch						
Unknown limb						
Forelimb (1 or both)						
Hindlimb (1or both)						
Head out of pouch						
Completely out of pouch						
Head in pouch (body out)						
Head bobbing (suckling)						
Play behavior						
Sniffing foods						
Eating solid foods						
comments:						

Kept next to the exhibit

Noted daily by the keeper

Tree Kangaroo Developmental Milestones Sheet

Dam Local ID:_________ Studbook #:__________ Name Dam:_________
Joey estimated/Actual DOB__________(if est +/_ days)Joey ID/name:_________ Studbook #:_________

	Note actual/estimated (in days)	Date	Direct/Video	Initials
Joey confirmed				
First Pouch movement				
Eyes open*				
Signs of Fur*				
Fine fur				
Fine fur – dorsum of forelimbs				
Fine fur – face				
Darker fur on arms and legs				
Dark pigmentation on tail				
Fully furred				
Claws pigmented				
Teeth*				
Lower incisors				
Upper incisors				
Whiskers Papillae apparent				
Ears				
Free from head				
Becoming upright				
Fully upright				
Genitalia				
If male –both testes? Is penis visible?				
If female pouch visible?				
Cloaca vibrissae				
Tail out of pouch**				
Limb out of pouch**				
Unknown limb				
Forelimb (1 or both)				
Hindlimb (1 or both)				
Head out of pouch**				
First pouch emergence*				
Head in pouch (body out)				
Head bobbing (suckling)				
Play behavior –Joey with dam				
In pouch				
Out of pouch				
Permanent pouch exit*				
Sniffing foods				
Eating solid foods*				
Weaned*				
Independent (Permanent separation)*				

ZIMS developmental milestone* * Note as Out of pouch body part in ZIMS and specify in comments*

What teat are they attached to?

Date							
L upper							
R upper							
L lower							
R lower							

Note Joey orientation
Suckling (Y/N)

Averages for milestones: - recorded in weeks
One limb out of pouch 20-21 (n=2)
Multiple parts out of pouch 21-22 (n=2)
Head out of pouch 22-25 (n=4)
First pouch exit 28-32 (n=10)
Fed alone (*eating solids) 27-28 (n=10)
Permanent pouch exit 39-41 (n=4)
Other Physical Characteristics:
Claws pigmented - 7 (n=7)
Lower incisors - - 20 (n=6)
Upper incisors - 30 (n=1)
Ears free from head - 11-15 (n=7)
Ears becoming upright 24 (n=1)
Ears fully upright 26 (n=1)
Eyes open 20-21 (n=7)
Fine fur -dorsum of forelimbs 11 (n=6)
Fine fur -rhinarium - 15-16 (n=7)
Fine fur -cloacal vibrissae 16 (n=7)
Fine fur -face 24 (n=1)
Darker fur on arms/legs 26-31 (n=2)
Dark pigmentation on tail 26 (n=2)
**Fully furred 22-29 (n=8)
Play Behavior - Joey with Dam:
While in pouch 26-29 (n=2)
Out of pouch 32 (n=1)

Institution:________________
Contact person:____________
Email address:_____________

Send completed data sheet to Woodland Park Zoo, Deanna Ramirez and Beth Carlyle-Askew at Deanna.Ramirez@Zoo.org or Beth.Carlyle-Askew@Zoo.org

Enter date of first time observed

If able to pouch check

-Document all items

If not able to pouch check

-Data entered from the Daily sheet

Tree Roo Keepers

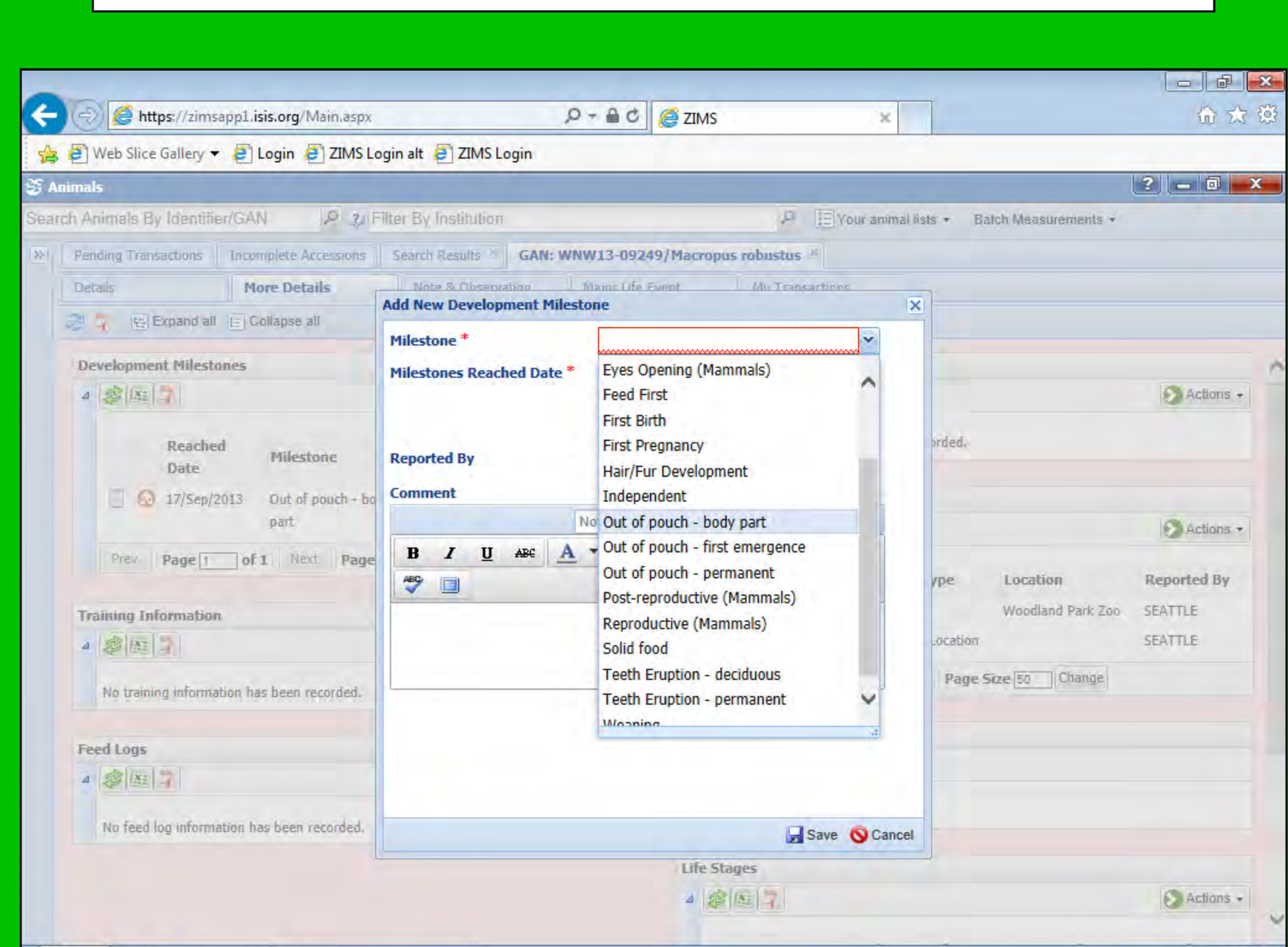
We need your help

Small sample size

Wide ranges

Email completed forms to:
Deanna.Ramirez@zoo.org
and
Beth.Carlyle-Askew@zoo.org

Centralized Data Reporting



Terminology was correlated with the Developmental Milestones section in the Zoological Information Management System (ZIMS)

Enter each milestone and ZIMS can generate the report

Other Roo Species?

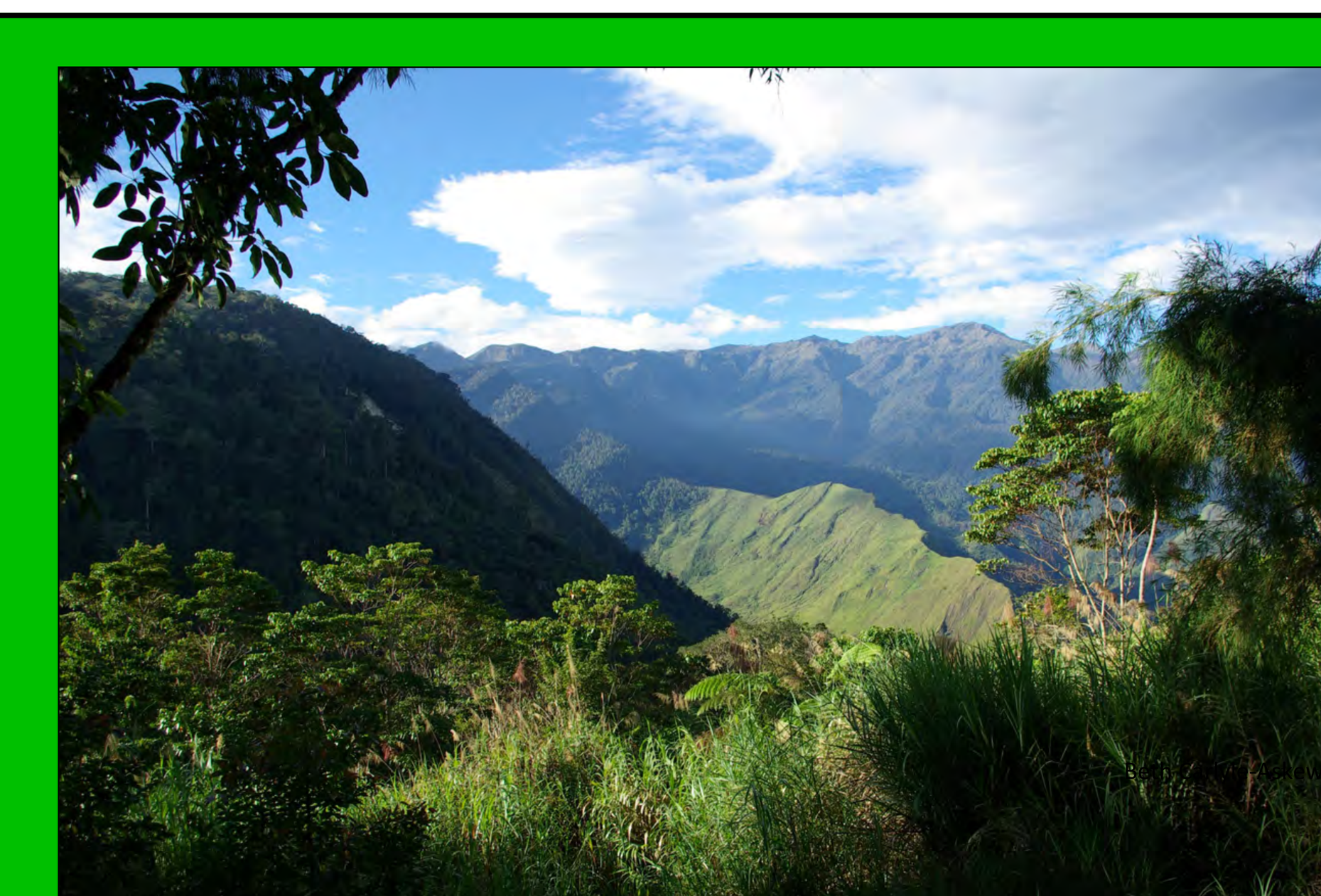
Dennis Dow/Woodland Park Zoo

In the Field

Joey in the pouch of a female wild tree kangaroo

How old is it?

- No observed copulation
- No observed birth
- Verify estimated age using developmental milestones



More information

- AZA tree kangaroo mailing list treeroo@lists.aza.org
- Facebook Group Tree Kangaroo SSP

Acknowledgements

Jacque Blessington, Lisa Dabek, Judy Steenberg
Participants at the 2013 Tree Kangaroo Workshop, Kansas City
Participants at the 2013 International Tree Kangaroo Workshop, Melbourne
Participants at the 2011 Tree Kangaroo Workshop, Seattle
Northern Trail & Australasia Keeper Staff
Woodland Park Zoo North Team Managers

“Fresh” Frozen Browse for 0.2 Reticulated giraffe (*Giraffa camelopardalis reticulata*) for the Winter

Mary Ann Cisneros[1] and Bobbi Crouch[1, 2]
[1]Mesker Park Zoo and Botanic Garden

Mesker Park Zoo’s (MPZ’S) Options:

APPROVED BROWSE LIST FOR MESKER PARK ZOO & BOTANIC GARDEN

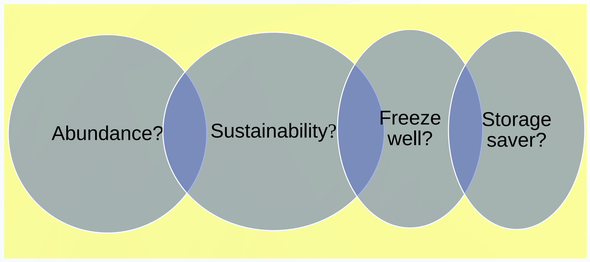
Reviewed June 2011 — Only plants on this list may be fed to animals

Common Name	Latin Name	Approved Animals (key below)
Apple	*Malus* spp.	All
Ash	*Fraxinus* spp.	H, P
Bamboo	*Indocalamus, Phyllostachys, Pseudosasa, Sasa*	H, P (execpt langurs/colobus)
Basil	*Ocimum* sp.	P
Beech	*Fagus* spp.	H, P
Blackberry	*Rubus* spp.	All
Birch	*Betula* spp.	All
Box Elder	*Acer negundo*	All
Callery Pear	*Pyrus calleryana ‘Bradford’* and cvs	All
Cattails	*Typha* spp.	All
Corn	*Zea mays*	All
Cottonwood	*Populus deltoides*	H, P
Crabapple	*Malus* spp.	All
Daylily (flowers only)	*Hemerocallis* spp.	P, H, R
Dogwood	*Cornus* ssp.	H, P, R
Elm	*Ulmus* spp.	All
Fig	*Ficus* spp.	All
Firethorn	*Pyracantha* spp.	All (Grown for insects)
Forsythia	*Forsythia* spp.	All
Giant Reed	*Arundo donax*	H, P (except langurs/colobus)
Grape	*Vitis* spp.	All
Hackberry	*Celtis* spp.	All
Hibiscus	*Hibiscus* spp.	All
Honey Locust	*Gleditsia* spp.	All
Honeysuckle	*Lonicera* spp.	All
Linden	*Tilia* spp.	All
Maple (See note below)*	*Acer* spp. *except A. rubrum and A. saccharinum**	p, H (except horses)
Mock Orange	*Philadelphus coronarius*	H
Mulberry	*Morus* spp.	All
Autum Olive	*Eleagnus* spp.	H, P
Ornamental grasses	*Miscanthus, Arundo, Tripsacum*	H, R, P (except langurs/colobus)
Redbud	*Cercis* spp.	All
Rose	*Rosa* spp.	All
Serviceberry	*Amelanchier* spp.	All
Sunflower	*Helianthus* spp.	All
Sweetgum	*Liquidambar styraciflua*	H, P
Sycamore	*Plantanus* spp	H, P
Viburnum	*Viburnum* spp.	All
Willow	*Salix* spp.	All

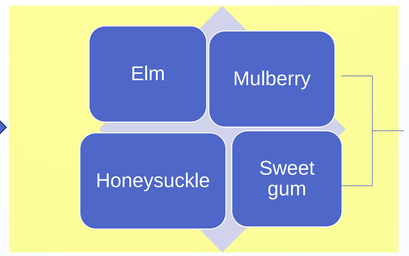
All = Appropriate for all Herbivores, H= Hoofstock (Antelope, Deer, Horses, Giraffe, Rhino, Tapir, Pigs)
P= Primates R= Rodents
*DO NOT FEED OUT Red Maple (*Acer rubrum*) and Silver Maple (*Acer socchorinum*) or their hybrids

Pick Your Perfect Browse Species:

What to look for:

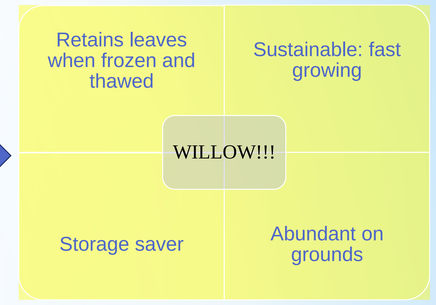


Species tried:

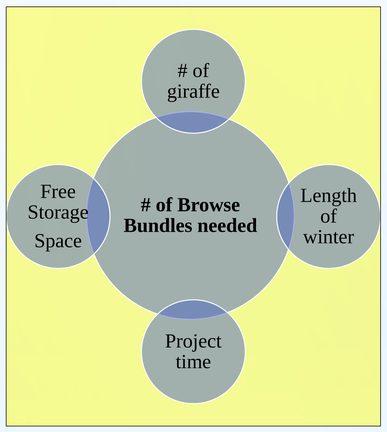


*When frozen and thawed did not retain leaves
*Take a lot of storage space
*Elm and Sweet gum are slow growers

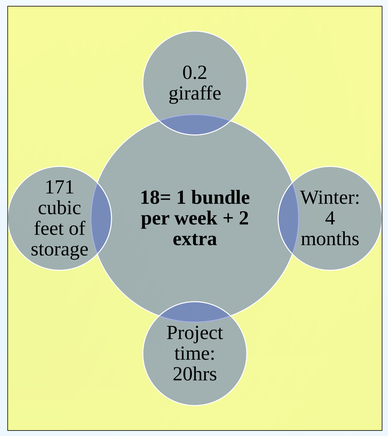
Best choice:



Considerations:



MPZ’S Considerations:



Method:

1. Collect Supplies: twine, plastic wrap, duct tape

2. Collect Willow

3. Bundling Willow (six branches to a bundle)

4. Mist Bundles

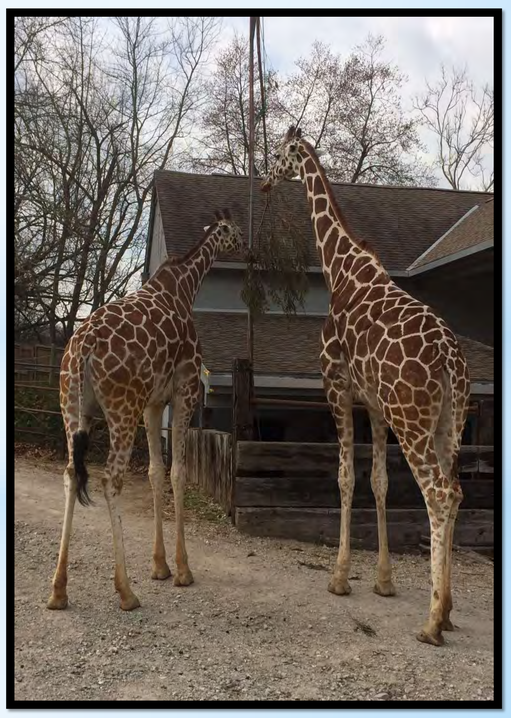
8. Giraffe enjoying browse in the barn.

5. Wrap Bundles

5a. Wrapped Browse vs. Unwrapped Browse

6. Freeze bundles

7. Thaw bundles (Ex. Pull frozen browse on Sunday, it will thaw by the next day)



8a. Giraffe enjoying willow browse outside during the winter months.

Acknowledgements:

***Mesker Park Zoo and Botanic Garden**
***Mesker Park Zoo AAZK**
***Melanie Ransom, retired MPZ Keeper**
***Chris Barth, Zoological Manager Disney Animal Kingdom Lodge**
***Joe Darcangelo, Zoological Manager Disney Animal Kingdom Lodge**
***Steve Metzler, Animal Curator Disney Animal Kingdom Lodge**

Bowling for More than Just Rhinos:
Using Cinco de Rhino to Highlight Other Species Saved by Rhino Conservation

Bridget Cronin
Cheyenne Mountain Zoo

At the move like a rhino station, guests were wrapped up in bubble wrap and tried to pin the tail on the rhino using rhinoculars.

AAZK chapters across the nation raise over $300,000 annually for rhino conservation through Bowling for Rhinos events. In recent years, Cheyenne Mountain Zoo has hosted an educational Cinco de Rhino event on zoo grounds to increase awareness about the plight of wild rhinos, and to inspire conservation action. This year we expanded the aim of the event to help people understand why rhino conservation is critical. Rhinos serve as a flagship species; protecting their habitat means that numerous other species across Asia and Africa will also be protected. In order to highlight the other animals helped by rhino conservation, we expanded our Cinco de Rhino event to include animals throughout the zoo in addition to rhinos. Through a zoo-wide scavenger hunt we were able to educate guests about the widespread effects of rhino conservation and the additional animal species that these funds support. By demonstrating rhinos' role as an umbrella species, we were able to inspire greater commitment to rhino conservation efforts, thus expanding potential fundraising options.

Fundraising efforts included the sale of animal art and footprints from a number of the species under the rhino conservation umbrella.

What is Cinco de Rhino?

Cinco de Rhino is an educational event that encourages guests to participate in fun, rhino-themed activities to learn about rhinos and inspire conservation participation. This event is both a promotion for our Bowling for Rhinos event and a fundraiser.

Activities included:

- •Pee like a rhino
- •Wallow like a rhino
- •Move like a rhino
- •Enrichment making
- •Scavenger hunt

Zoo Wide Involvement:

This year our Cinco de Rhino event highlighted a number of non-rhino species in our zoo that are also aided through rhino conservation. A zoo-wide scavenger hunt was created to help engage guests in learning about the wide range of additional animal species that these funds support. Guests were given clues leading them to an animal exhibit, where they would search for the scavenger hunt tag giving them letters to fill in the secret message. Both an adult and child version were created so guests of all ages could participate. To encourage participation, completed scavenger hunts could be turned in for an entry into the drawing to meet our rhino. An informational poster at the biofacts table further detailed each of the conservation organizations supported by Bowling for Rhinos funds, and the projects and species which they currently strive to protect.

Fundraising Expansion:

In previous years fundraising efforts at this event have included can recycling for rhinos, a bake sale, and raffling a meet and greet with our rhino. By including the entire zoo, we were able to expand our fundraising options. This year we sold art made by many of the species under the rhino umbrella, as well as photos of our animals. We also raffled off meet-and-greet and enrichment opportunities with a number of additional animal groups.

Guests were able to make enrichment for our elephants and then come out into their yard to help hide it.

Participants at the Pee Like a Rhino station used a water bottle to see how far they could 'spray' behind themselves compared to a rhino.

Cinco De Rhino Scavenger Hunt

1. This black and white striped animal is one of the rhino's closest relatives.
2. The males of this species have thick manes.
3. These small 'kats' stand up on their hind legs to watch for predators and protect their underground tunnels.
4. We have a large number of this brown and white spotted animal at the zoo.
5. This white bird is a natural pest controller because it eats bugs. It also shares its yard here at the zoo with a (fake) zebra carcass.
6. Known as the watch chicken, this small African bird has a very loud alarm call. They have grey and white polka dotted feathers.
7. This animal gets its name, which means 'water horse', because it spends most of its day in the water. It is the third largest animal at the zoo.
8. The red-heads of the great apes.
9. These gibbons are the smallest ape in Primate World.
10. These bears are also called moon bears because of the crescent shaped mark on their chest.
11. This lizard uses its specialized feet to climb on the walls and ceiling.
12. This animal has the largest ears at the zoo.

__ __ __ ' __ __ __ __ __ __ __ __ __ __
1 5 9 3 7 10 1 2 4 6 8 11 3

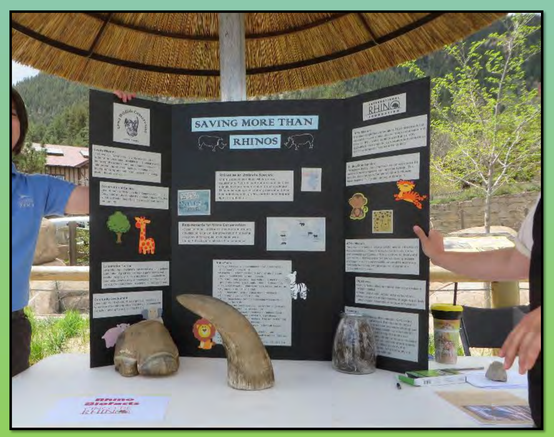
__ __ __ __ __ __ __ __ __ !
12 4 5 2 4 10 6 8 9

This child version of the scavenger hunt had twelve clues leading participants to animals around the zoo that are also aided under the umbrella of rhino conservation.

CINCO DE RHINO
INTERNATIONAL RHINO FOUNDATION

African Lion!
Question 2 Letters: R and a

These small tags were placed at each scavenger hunt exhibit to let participants know they had found the right answer, and to give them the letters needed to fill in the mystery phrase: Don't let rhinos disappear!



An informational poster at the biofacts table highlighted the conservation organizations supported by Bowling for Rhinos funds, and the projects and numerous species that they work to save.

In addition to larger art pieces, smaller items including animal photos, mini canvas paintings, and rhino trading cards were available for purchase.

A meet-and-greet experience with our rhino was raffled off. Raffle tickets could be purchased, or earned by completing the scavenger hunt.

Acknowledgements:

Thank you to all of the AAZK members and docents at Cheyenne Mountain Zoo for helping to plan and run this event. Thank you to all who donated art, photos, or animal experiences to help us raise funds for all the animals under the rhino conservation umbrella.

Parent-Reared to Programs to Patient:

Training Former Exhibit African Crested Porcupines for Encounters and Medical Procedures.

Bridget Smith and Mary Pederson

MINNESOTA ZOO
Changing how you see the world

TRAINING: Key Points

- Defensive behavior towards keepers declined dramatically in a neutral training area, allowing for rapid progression of encounter training behaviors.
- Harness training began by placing the harness on the ground in front of the cinder block station, giving the porcupine the cue to station, reinforcing, and moving the harness around the porcupine's body with gradual approximations.
- A double door crate worked well to acclimate the porcupines to crating, as they were able to walk through the crate and get reinforced instead of having to back out or turn around.

Summary

The Close Encounters program at the Minnesota Zoo enhances the guest experience and inspires conservation. Chimba and Bizi, 0.2 African Crested Porcupines (*Hystrix africaeaustralis*) came to the zoo at 11 months of age in the spring of 2012, to be incorporated into a multi-species African animal program the following summer. The porcupine siblings were exhibited with their parents at their previous institution, and had little formal training before coming to the Zoo.

Upon leaving quarantine, Chimba and Bizi moved into a temporary enclosure for three months. Target and crate training began, and keepers observed defensive behaviors, including stomping, tail rattling, and vocals. Due to the porcupines' behavior and limited space, training was done primarily through protected contact. Defensive behaviors declined, but it was not until Chimba and Bizi moved to their new enclosure that significant training and behavioral improvements were made. Brighter lighting and wider mesh in the new enclosure seemed to contribute to improvements. New behaviors were added, and keepers used smaller barriers between themselves and the porcupines. A training breakthrough occurred towards the end of October. During a session, Bizi climbed over the barrier and began exploring the section of the room used to prepare diets and train flighted birds. She was joined shortly by Chimba, and both porcupines appeared noticeably less defensive in this "neutral area" than when in their enclosure. Free contact training in this area became the new training focus.

Training progressed much faster in the neutral area. Both porcupines were successfully harnessing by early January, and both had a successful harness, crate, and transport to the Zoo's indoor auditorium by the end of March. Chimba and Bizi explored the outdoor program venue when Zoo grounds were free of guests, and were acclimated to larger groups of guests through visits at different times of the day.

On Memorial Day weekend, the debut of the Africa program, both porcupines were calm and attentive to keepers for the programs. Chimba and Bizi adapted to many different styles of programs at venues around the Zoo, highlighting the importance of training, enrichment and conservation.

Medical Applications of Encounter Training

Unexpected Benefits

The encounter training had the unexpected benefit of aiding in the health management of Bizi after her diagnosis of dilated cardiomyopathy.

Training with her multiple times a day gave us the opportunity to quickly recognize when her behavior was abnormal. Guest interactions got her comfortable with many different people and situations; this set her at ease with our veterinary staff. The stationing behavior was crucial in training her for voluntary x-rays. The harnessing behavior got her prepared for measuring her heart rhythms and voluntary ultrasounds that were performed frequently by veterinary staff to monitor her condition. Dilated cardiomyopathy has no cure, but with these training techniques we were able to better manage the condition and the secondary effects resulting in a higher quality of life in her last months.

Porcupine Introductions

New Animal, Different Approach

The porcupine that was brought in as a companion for Chimba had a drasticaly different temperament, which warranted a different training approach.

Mindi had been raised similarly to Chimba. She was a parent-reared exhibit animal with very little formal training before arriving at the Minnesota Zoo. Her different temperament, however, required a new training approach. She showed few signs of defensive behaviors towards keepers, and was easily approached. However, her timid temperament added unforeseen difficulties when introducing her to the neutral training area and to Chimba. We are using positive reinforcement to encourage Mindi to explore the training area and interact with Chimba. Due to Chimba's dominant nature, the early training focus was on short, positive interactions. Progression appeared limited during the short sessions so the porcupines were given full access to one another in the neutral training area for longer periods. While aggressive behaviors are still observed, positive interactions have increased.

ACKNOWLEDGMENTS

Special Thanks to: Carey Goedel, Terah Grace, Christine McKnight, Kim Quam, Rachel Thompson DVM, American Assoication of Zookeepers of the Minnesota Zoo

Care of a Neonate Grey Seal (*Halichoerus grypus*) at Smithsonian's National Zoo

Jackie Spicer

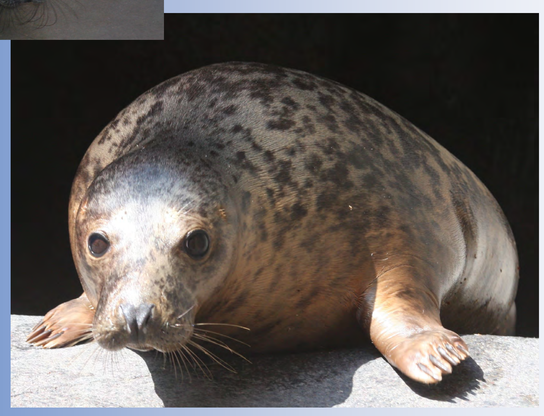
American Trail, Center for Animal Care Sciences, Smithsonian's National Zoological Park

Smithsonian Institution

On January 21, 2014, a female grey seal was born in the American Trail Exhibit at the Smithsonian's National Zoological Park (NZP). The mother is currently the oldest grey seal to give birth in human care, and was not lactating enough to sustain normal pup development and growth. The decision was made to supplement the pup's dietary needs with regular tube feedings while leaving the pup with her mother to be reared naturally. To increase the success of this endeavor, NZP communicated closely with several institutions and colleagues regarding nutrition, vet care and behavioral changes. This proved to be successful as the pup steadily gained weight and continued normal social interactions with the other seals in the collection. NZP's goal is to share our experience with the zoological community, in hopes of providing useful information to other institutions.

Rona born January 21, 2014

Public debut July 2, 2014



Tube feeding

Pup Caring Process

- Pregnancy was confirmed by vet staff with use of ultra sound. Possible pupping date range was created.
- High risk pregnancy due to mothers age, 30
- Mother separated from other seals, off exhibit, in single holding pool
- Daily observations started when pupping range was reached. Video cameras were available and recording 24hrs
- Once pup was born, 24hr keeper watch began due to high risk factor of possible complications
- Pup started nursing within the first 10hrs
- Rona was kept with mother for natural raising experience

Food Progression

- Daily weights started January 22
- Expected weight gains were not seen
- Introduced whole fish slowly, by force feeding, January 30
- Changed to all fish diet on February 16
- Only fed herring to insure weight gain continued
- Beginning weight = 16Kgs, Weight as of July 2 = 66Kgs

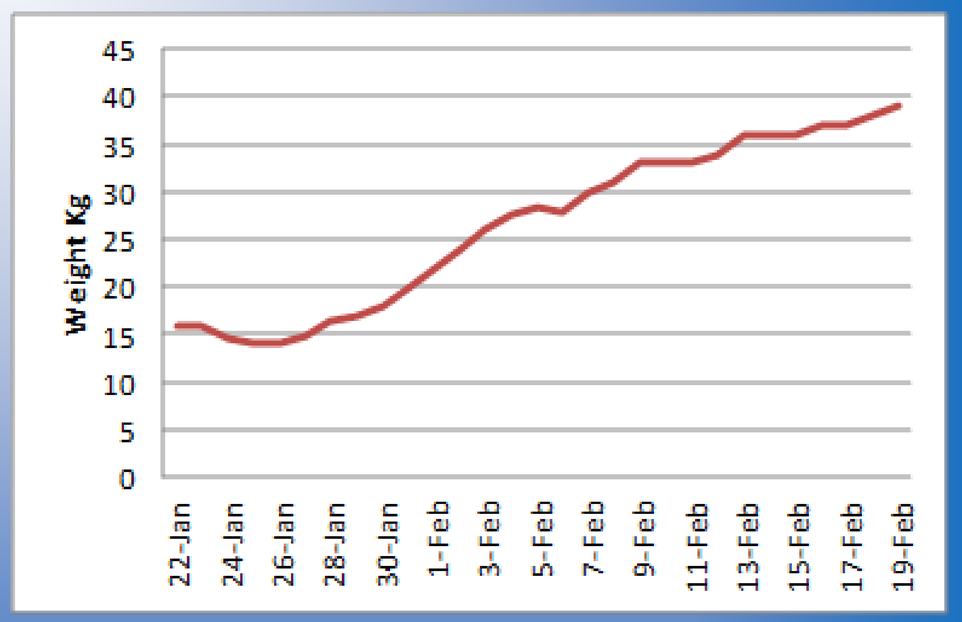
Tube Feeding

- Tube feedings began January 25
- Feedings occurred every 4 hours, 24hrs/day, for 11 days
- Slowly decreased feedings as Rona began refusing to participate
- Tube feeding discontinued on February 15

Twice daily weights to monitor growth

Nursing

Rona weights from Jan 21—Feb 19, 2014



Acknowledgements: I would like to thank the rest of the American Trail team at the Smithsonian's National Zoological Park (Christina Castiglione, Sara Colandera, Chelsea Grubb, Ryan Lacz, and Rebecca Miller)) for their constant help with the care of this animal. I would also like to thank the Smithsonian's National Zoological parks department of Wildlife Health Sciences and the Department of Nutrition for all their support and consultation. Lastly, I would like to thank Michele Pagel at the New Jersey Adventure Aquarium and Rita Stacey at the Brookfield Zoo for their willingness to share their wealth of grey seal information.

An Unlikely Introduction of a 0.1 Black Mangabey (*Lophocebus aterrimus)* *and a 0.1 Red-Capped Mangabey (Cercocebus torquatus)*

By: Claire Roy, Lead Keeper, Binder Park Zoo

Abstract

Limited holding space for off-exhibit animals is a common problem in zoos. Binder Park Zoo was running into this issue when two females, one a Red-Capped Mangabey (*Cercocebus torquatus*) and one a Black Mangabey (*Lophocebus aterrimus),* were rejected by their familial troop. At the time, these females lived with their sire and an unrelated female was introduced to the pair. Both females were implanted and the new female was meant to breed with the male. In both cases, once the male and new female began to breed, the breeding pair showed aggressive behavior towards the daughters., resulting in the daughters having to be separated from their troop. The primary keeper then had to decide what the best course of action for both these females would be. We hoped to send both primates to other institutions, but with both of these species representing a Red Species Survival Plan (SSP), this was going to be difficult, and at the very least time consuming. So what to do? This is how Lola, our 3 year old Red-Capped Mangabey, and Juji, our 7 year old Black Mangabey, became friends. Lola and Juji have been together over a year and have continued to do great together, making a statement in our now mixed species Mangabey exhibit.

Introduction

Binder Park Zoo is home to two Mangabey exhibits, one that exhibits Red-Capped Mangabey's, and a second that exhibits Black Mangabey's with Black and White Colobus Monkey's. Juji, a female Black Mangabey, was born at Binder Park in 2005. She lived with her sire and dam until, her mother died. Juji and her father, Lance, lived together until fall of 2013 when we received Sunniva, our new breeding female for Lance. We then started a lengthy introduction process, that unfortunately ended with Juji having to be separated from 1.1.

Upon separating, Juji developed strong stereotypic behavior of pacing and head rolling. We tried increasing enrichment and training but eventually had to try medicating her when nothing would work. She became so bad that it was hard to break her out of it and worried these behaviors would become permanent. We were stuck and not sure what our next move was going to be.

This is where Lola comes in. Lola was also born at Binder Park in the fall of 2010. She lived with her sire and dam until her mother passed away when Lola was only 4 months old. Lola went through multiple troop arrangements, the last of which resulted in her receiving a severe wrist wound. Lola had to undergo invasive medical treatment and had to be separated for her to heal. Aggression with her troop continued through the caging so we decided that a successful introduction was unlikely. So now we had two solitary Mangabey's of a different species but were both sexually mature, implanted females.

Methods

After convincing my supervisors and consulting with the Mangabey SSP Coordinator we decided to try to introduce Lola, our 3 year old, female Red-Capped Mangabey, and Juji, our 9 year old, female Black Mangabey together.

We knew there would be some obstacles for them. For instance, Both species are from the family Cercopithecidae, but Black Mangabey's are of the genera Lophocebus which are mainly arboreal Mangabey's. Red-Capped Mangabey's are of the genera Cercocebus which are mainly terrestrial., but in captivity , they equally exhibit both location choices.

We set up this introduction like we would any other:

- Placing them side by side in visual introduction for a day or so.
- Before we opened the doors, keepers placed a variety of enrichment to help alleviate any stress. We made sure their was enough of all items for enrichment so to not create any aggressive situations.
- We had multiple keepers that the girls were familiar with.
- We had devices ready incase we needed to separate them in an emergency.
- All aspects of the introduction were recorded with a camcorder and hand written for review.

Once we opened the doors, both girls were a little leery of each other, each choosing a stall to stay in. Then, Juji continued her stereotypic behavior, pacing through all the stalls and walking right past Lola. Eventually, Juji would stop and check Lola out. They would do some tongue flicking at each other and then go back to their individual stalls. Juji was the first to show any aggression by jumping at Lola once but it was quick. Juji was first to present, which is a Mangbey's form of greeting. Juji presented a few more times, but Lola had her guard up. Eventually Lola did present to Juji and they seemed to except each other at that point. Juji did establish herself as the Alpha.

1: First encounter

2: Juji being aggressive

3: Juji Presenting

4: Juji Presenting again

5: Lola approaching Juji

6: Lola presenting

Results

Today, Lola and Juji are still together and give the guests a real show in what was our past Red-Capped Mangabey exhibit and has become a Mixed Mangabey exhibit.

Their future does hold more issues for them.

- We have placed a birth control implant in Lola twice now and both times she has gotten them out, the last of which happened when Lola and Juji were together. When Lola is in full perineal swelling, she does become difficult to shift and is less interested in Juji. This does cause some minimal aggression due to Juji's status of Alpha, but hasn't led to anything serious as of yet.
- The attempt to treat Juji's stereotypic behaviors with medication and a companion, did lessen them but not extinguish them. I am concerned that these are now part of her permanent behavior repertoire.
- We have decided to send both Lola and Juji out so we can free up some holding space. If one of the animals leaves before the other, we could be looking at an unknown future for the remaining individual.

Juji relishing in her status of alpha, and Lola humbly grooming her.

Conclusion

All in all, we are pleased that we were able to think out of the box and place two unlikely friends together. I feel it is important for keepers to advocate for their animals and play a role in solving animal welfare issues, even when they might seem crazy. Lola and Juji continue to be a hit in our Red-Capped Mangabey exhibit and has been fun to educate our guests about their story and Mangabey's as a disappearing species.

Lean on Me:

The Value of Knowing and Relying on your Fellow AAZK Chapter Leaders

Elise Bernardoni[1], Rachael Rufino[2], Robin Sutker[3], and Stephanie Turner[4]

Zoos are entering an age of heightened advocacy, collaboration, and transparency. In order to better the future of zoos and the zoo keeper profession as a whole, AAZK chapters strive to build open relationships with their home institutions and with other chapters. Building a strong chapter isn't easy, especially if a home institution is reluctant or unable to support you. As such, communication amongst chapters is one of the most powerful tools for growth and stability. We provide each other with advice, guidance, fundraising suggestions, and professional and personal support. Chapters have traditionally used email and conferences to stay in touch, but AAZK online and Facebook are quickly becoming popular and useful networking and collaboration tools.

Making it Work with Chapters BIG and small (with distance between farthest facilities):

Greater Houston Chapter: one zoo
National Chapter: one zoo, one breeding facility; 70 miles apart
New York City Chapter: four zoos, one aquarium; 30 miles apart
San Francisco Bay Area Chapter: three zoos and three museums; 50 miles apart

HELP! And Where to Find It:

AAZK Online forums
Facebook AAZK page, Chapter pages, AAZK Presidents and Leaders group
Email another chapter (chapter emails are listed on AAZK.org) or officer
Chapter websites

Teamwork Makes the Dream Work:

With 100 chartered AAZK chapters nationwide, communication between chapter leaders is essential for us to meet our common goals. Each chapter supports AAZK's mission to advance excellence in the animal keeping profession, foster effective communication, and support conservation projects that preserve animals and natural resources. Supporting this mission through numerous meetings and events throughout the year can be challenging for officers, who may need additional support. By communicating with other chapter officers across the country, we exchange ideas, address issues and find solutions more effectively than we would alone. This open communication also enables us to help our chapters grow and strengthen through creative solutions and more successful events. By sharing our collective experiences to improve our chapters, officers can better support AAZK's mission while getting reassurance and guidance from each other.

Do It, Try It, Fix It:

Although AAZK chapters can differ greatly in size, atmosphere and participation, officers agree that there are common issues throughout. Open lines of communication among chapter leaders to promote successful solutions for these issues allow us to make changes more efficiently without "reinventing the wheel." A common problem chapters face is lack of participation from facilities, members and officers within the chapter. Facilities and members that are geographically distant have difficulty coming together for meetings and events. Facilities may not always be openly supportive of outside organizations. Officers may lack motivation, leadership and fundraising experience. Chapter recruitment methods, benefits, fundraisers and other events can be lack-luster without the exchange of new ideas. All of these issues can bring down chapter morale and decrease a chapter leader's enthusiasm. By communicating with other leaders about common problems and solutions, we get the reassurance and support we need to effectively follow through with AAZK's mission.

Bay Area AAZK Fall 2013 Mini Conference

How Chapters Have Already Helped Each Other:

- Fundraising competitions between facilities and/or chapters
- Large chapter (two or more facilities) or regional presentation evenings
- Keeper exchanges (inter and intra chapter)
- Sharing of ideas for membership, fundraising, and event planning
- Inviting other regional chapters to events
- Getting members (and keeping them!)

National Capital and Greater Baltimore AAZK Keeper Swap 2013

Ideas for Your Next Chapter Fundraiser:

- Book, candy, or bake goods sales
- Chapter t-shirt and other merchandise (key rings, water bottles, pens, flashlights, etc.)
- Facebook photo contests
- Coin funnels and "Penny Wars"
- Calendars (with pictures from photo contests)
- Greeting cards (with pictures or animal art)
- Holiday ornament and décor sales (animal art)
- Silent auctions for facility administrative staff
- PayPal "Donate" button on website
- Utilize free online resources like Facebook Events, EventBrite, and Café Press (online merchandise) store)
- Reach outside the zoo community to raise money

Keeping it Organized and Getting Members in the Door:

- Keep open communication between members, facilities, managers, other chapters, and National
- Sharing bylaws and member incentive programs
- Member participation point systems
- Contact list for who in your facility can help
- Ask for a management liaison(s)
- Chapter binder—where ALL important chapter information is kept and updated
- Figure out the best way to keep finances organized
- Know each facilities "double dipping" rules for company sponsorships
- Don't try to do it all - a few good events are better than a lot of messy ones
- There are NO stupid questions - ask for help!

[1]National Capital Chapter President (Senior Manager of Education Programs, Friends of the National Zoo, National Zoo) BernardoniE@si.edu, [2]Bay Area Chapter President (Animal Keeper, CuriOdyssey) Rachael.cecelia@gmail.com, [3]Former New York City Chapter President (Animal Keeper, Maryland Zoo in Baltimore) Robin.Sutker@gmail.com, [4]Former Greater Houston Chapter (Animal Keeper, Houston Zoo) sturner@houstonzoo.org

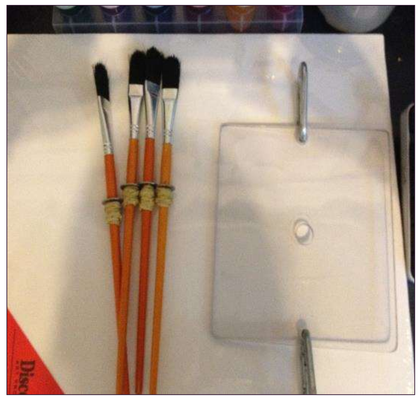
Utilizing Tool-Use Ability in White-Throated Capuchin Monkeys (*Cebus Capucinus*): Training to Manipulate a Paintbrush

Heather Tassler
Wild Animal Keeper, Wildlife Conservation Society, Bronx Zoo

Abstract

Capuchin monkeys have been documented using tools in the wild, which inspired the idea to try teaching the Bronx Zoo's group of ten capuchins to paint by manipulating a paintbrush. This has proven to be a great enrichment and training tool. Working with ten capuchins is challenging at times, particularly working with a group that has a shifting hierarchy. Our group consists of an adult male, juvenile male, four adult females, and four juvenile females. The group has access to an indoor exhibit, an indoor off-exhibit area, and an outdoor exhibit; painting sessions were held in the outdoor exhibit area.

The capuchins are trained in a group setting with a paintbrush attached to their cage front; individuals choose if they want to participate, and take turns manipulating the paintbrush. Teaching them to use the paintbrush in a group setting was achieved in a small number of steps. As a result, we have multiple individuals sharing time using the paintbrush and even teaching group members how to paint. Painting provides great mental stimulation by utilizing this species natural tool-use behavior, and also strengthens the capuchins' relationship with their keeper.



Paintbrushes and Plexi-glass

Painting Set-up

Capuchin Perspective

Materials and Training Steps

Materials

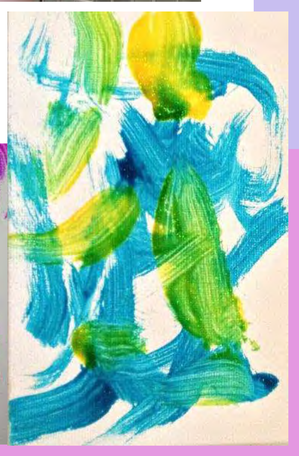
- Wooden-handled paintbrushes with attached rubber bands and washers
- Square plexi-glass with hole
- Carabineers
- Non Toxic Paint
- Canvas
- Clicker (bridge)
- Syringe filled with applesauce as reward

Training Steps

- Introduce paintbrush
- Bridge and reward for targeting handle of brush (previously target-trained)
- Insert paintbrush into plexi-glass frame and attach by carabineers to outside exhibit cage-front
- Introduce verbal "PAINT" cue for touching and moving brush in frame
- Replace clicker with verbal bridge "GOOD" in order to free a hand to hold canvas
- Canvas is placed in front of brush and animals are bridged for moving brush on canvas
- Apply non-toxic paint to brush which is touching canvas, and ask for "paint" behavior

Acknowledgements
Special thanks to Monkey House Keepers, Kitty Dolan, Jessica Moody, Josh Charlton and Colleen McCann

Capuchin Art



Changing It Up!
Creating a Rotational Exhibit for Two Primate Species at Sequoia Park Zoo

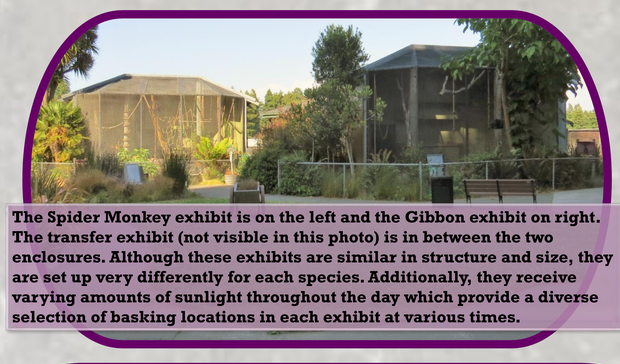
Janée Zakoren
Zoo Keeper, Sequoia Park Zoo

ABSTRACT:

Nestled in the heart of the Redwoods in Northern California, Sequoia Park Zoo is the oldest zoo in the state. During its 107 year history, what began as a walk through park with primitive animal enclosures has evolved into a modern AZA-accredited educational facility featuring wildlife in naturalistic exhibits. During the 2005 Accreditation process, the AZA committee and zoo staff recognized a serious safety concern with the free contact primate husbandry practices that were in place. Creating new protocols laid the groundwork for an incredible enrichment opportunity for two primate species at our zoo: Brown Headed Spider Monkeys (*Ateles fusciceps*) and White-Handed Gibbons (*Hylobates lar*). Being a small institution with limited funding and having outdated primate exhibits, the zoo staff was prompted to construct a new transfer enclosure between the two exhibits. This transfer unit would be used to move one species at a time into the transfer enclosure thus allowing keepers to service the exhibits safely while maintaining protected contact at all times. With the successful completion of this project, we began to envision a rather unique enrichment opportunity that could further build on its success. Rotating exhibits are becoming quite common in modern exhibit design and while Sequoia Park Zoo's Master Plan incorporates rotational exhibits, the primates that are currently housed here are older and will not likely live to see a new exhibit. In keeping with our commitment to maintain the highest standards of animal care, we decided it was time to "double" their living space by giving them a rotational exhibit using the structure we already had in place. After consulting management and veterinary staff, a training plan was implemented in February 2012. In January 2013, after 11 months of training, the primates switched exhibits for the first time and were viewing the zoo from a whole new perspective. These individuals have been housed in these enclosures between 20 and 33 years and by providing our primates with the ability to explore a new exhibit and its associated view, we've made a world of difference in their lives.

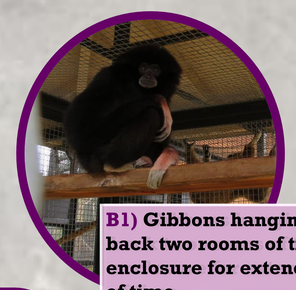
B1) 1.1 Spider Monkey hanging out in back room of transfer exhibit for extended period of time.

A1) 1.1 Spider Monkeys transferred and secured into back two rooms of transfer enclosure.



The Spider Monkey exhibit is on the left and the Gibbon exhibit on right. The transfer exhibit (not visible in this photo) is in between the two enclosures. Although these exhibits are similar in structure and size, they are set up very differently for each species. Additionally, they receive varying amounts of sunlight throughout the day which provide a diverse selection of basking locations in each exhibit at various times.

A1) 1.1 White-Handed Gibbon transferred and secured into back two rooms of transfer enclosure.



B1) Gibbons hanging out in the back two rooms of transfer enclosure for extended period of time

C1) Spider Monkeys getting comfortable with the Gibbons moving through the transfer chute.

TRAINING PLAN:

This training included several stages for each species. Below are the steps taken to attain successful exhibit transfers for both species.

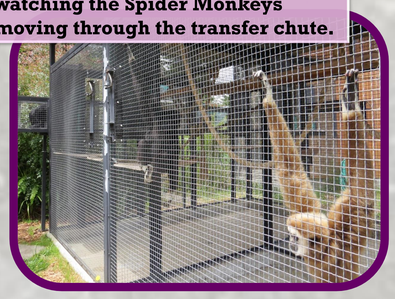
Phase One

- **A1)** Train to shift into the back two rooms of transfer exhibit on command.
- **B1)** Train to be locked into the back two rooms of transfer enclosure for extended time periods.
- **C1)** Desensitize to viewing neighboring species moving through transfer chute while secured in back two rooms of transfer exhibit.

Phase Two:

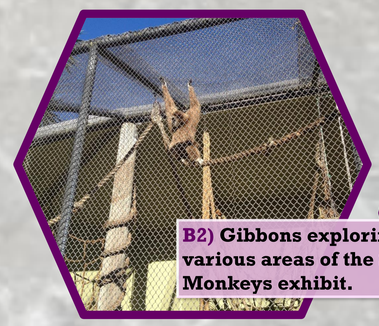
- **A2)** Train to move through transfer chute to other species exhibit on command with neighboring species secured in the back two rooms.
- **B2)** Desensitize to being in neighboring species exhibit
- **C2)** Train to recall back to door at their own exhibit through transfer chute from other exhibit on command.

C1) Gibbons getting comfortable watching the Spider Monkeys moving through the transfer chute.

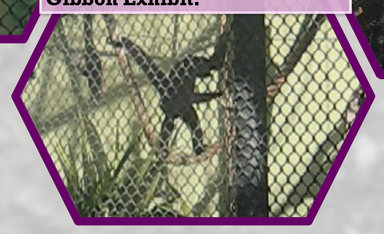


A2) Gibbons transferring through chute to Spider monkey exhibit on command with Spider Monkeys secured in back rooms.

A2) Training Spider Monkeys to transfer to Gibbon exhibit on command with Gibbons secured in back rooms.



B2) Gibbons exploring the various areas of the Spider Monkeys exhibit.



B2) Spider Monkeys exploring the various areas of the Gibbon Exhibit.

C2) Spider Monkeys returning to their exhibit from Gibbon exhibit on command.

C2) Gibbons returning to their own exhibit from Spider Monkey exhibit on command.

SEQUOIA PARK ZOO

Training 4.2.1 Rodrigues Fruit Bats (Pteropus rodricensis)

Janelle Murphy
Moody Gardens

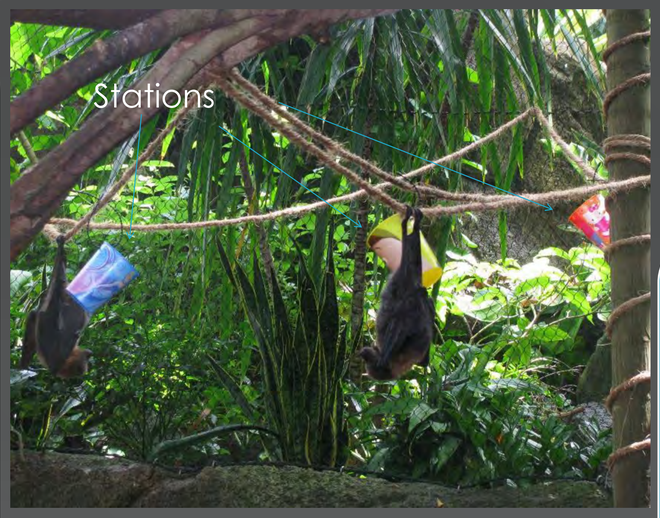
The Rodrigues Fruit bat (*Pteropus rodricensis*) exhibit is a mesh enclosure, that is roughly 10' x 25' x 30'. The 4.2.1 Rodrigues bats are housed with several tropical bird species and 0.1 Linne's two-toed sloth (*Choloepus didactylus*). Due to the height of the exhibit, extra feeding opportunities from other taxa, and the social hierarchy of the bats, training can be a challenge. The need to train a recall and to focus the bats attention to one location became quickly apparent. Recall training has allowed for daily inspections of all bats and station training has allowed each bat to have productive training sessions. Other behaviors that have been trained are crate, target, and a "step up" behavior.

Recall Training

- Ring bells for 20 seconds before putting in food.
- Ring bell and only put the food in if at least some of them come down.
- Once they start coming down start trying to tong feed reinforcers instead of putting in the food.
- Start not putting in the food unless most of the bats come to recall.
- For all the bats to complete recall took about 9 months.

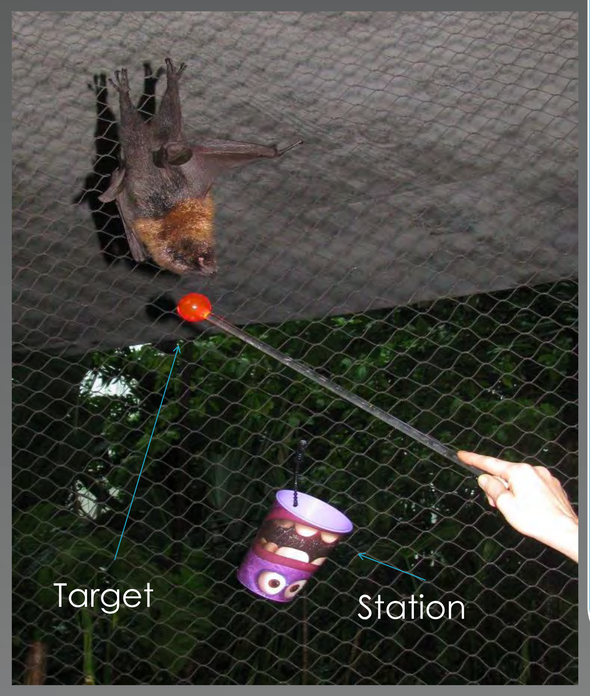
Recall training problems

- Problem: Bat and sloth food left in overnight.
- Solution: Move everyone in the exhibit to a day time feed schedule.
- Problem: sloth and bird food in exhibit.
- Solution: Feed the birds down low until after the training session. Put the sloth food in the back of her crate and only when she comes down in the AM otherwise wait until after the session is over.



Station Training

- Cups were used for the stations, each bat has a specific cup.
- Introduced station in feeding territory and B&R any movement towards it.
- B&R for touching station with nose.
- B&R for staying at the station.
- Five of the bats took about 5 months and the 6th had it in 7months. The baby born in the exhibit had it in a couple of sessions.

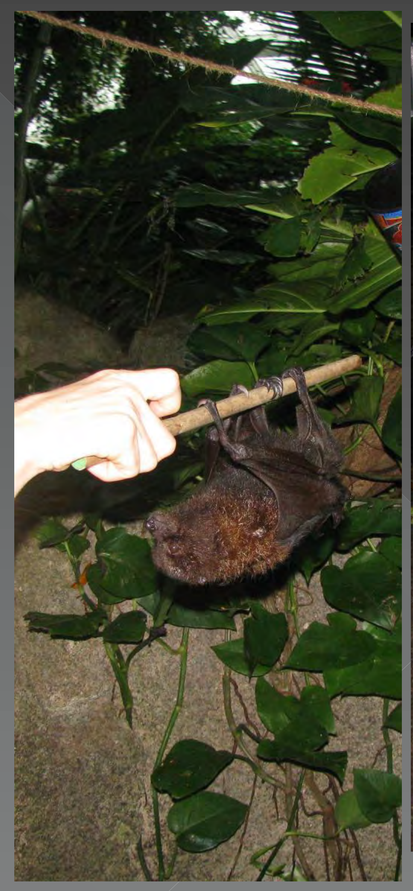


Crate Training

- Crate was placed next to a station and food was placed inside. Only the bat who's station it was went into the crate the rest stayed at their station.
- After a bat would go in the baited crate with keeper standing next to it the food was removed.
- B&R any movement towards the crate.
- B&R going into the crate.
- B&R calm behavior while keeper was touching the door.
- B&R calm behavior while closing the door.

Step up

- This behavior is when a bat gets onto a dowel and is calm while being carried around. It allows the bat to be moved to a modified T-stand for voluntary weights.
- Introduced dowel by carrying it around while hand feeding.
- Hold dowel out for investigation. B&R for any investigating of it.
- Hold dowel out for investigation. B&R for any investigating of it.
- B&R holding onto the dowel.
- Target bat to come out farther on dowel until all the way on it.



Overnight Behavioral Study on 1.1 Brazilian Ocelots (*Leopardus pardalis*)

Jennifer Fair

Greenville Zoo

Introduction/Background:

- A digital trail camera became available so I took the opportunity to record our 1.1 Brazilian Ocelots
- The female has always been more active than the male during the day, but I was curious about their behavior when the zoo was closed and no staff present

- The goal for our pair is for them to breed, and being nocturnal I was hoping to catch breeding behavior on the camera, as well as learn how they spend the majority of their time

Methods:

- The camera, in a protective box, was placed in their exhibit around 4:40pm and retrieved the next morning around 8:30am
- Recording started May 29, 2013 and continued until August 27, 2013
- 51 nights recorded with 7,551 total

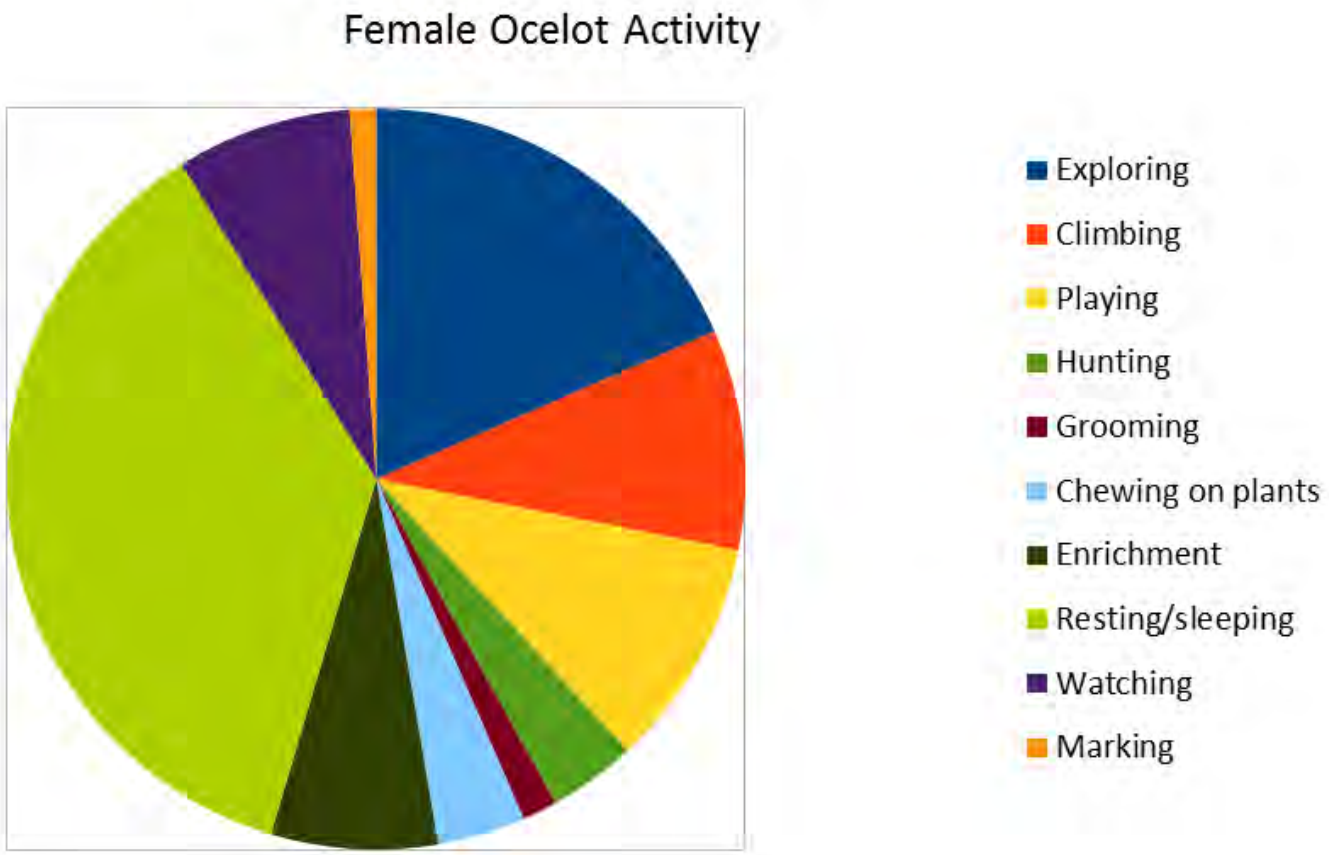
videos

- Camera recorded videos initially for 15 seconds then changed to record for 30 seconds with a 30 second delay between recordings

Results:

- Behaviors observed were resting/sleeping, grooming, travel, hunting, play, and estrus related behaviors
- Of the 7,551 videos, 5,309 showed ocelot activity
- 1.0 ocelot only one seen active 36% of the time

- 0.1 ocelot only one seen active 32% of the time
- Activity from both ocelots was seen 12% of the time
- 0.1 ocelot presented more behaviors
- 0.1 ocelot did go through estrus cycles during the recording period and unfortunately little response was noticed from the male


Female Ocelot Activity
Exploring
Climbing
Playing
Hunting
Grooming
Chewing on plants
Enrichment
Resting/sleeping
Watching
Marking

Discussion:

- There was not a lot of difference in the amount of occurrences for each activity when comparing the two ocelots
- 0.1 ocelot showed more play behavior and interacted with the enrichment more
- It was impossible to capture the entire exhibit in the field view of the

camera – to help counteract this issue the camera was placed in different locations from night to night

- These trail cameras are made for wildlife, however have also proven beneficial in a zoo setting

Illustration 1: 0.1 ocelot hanging off props

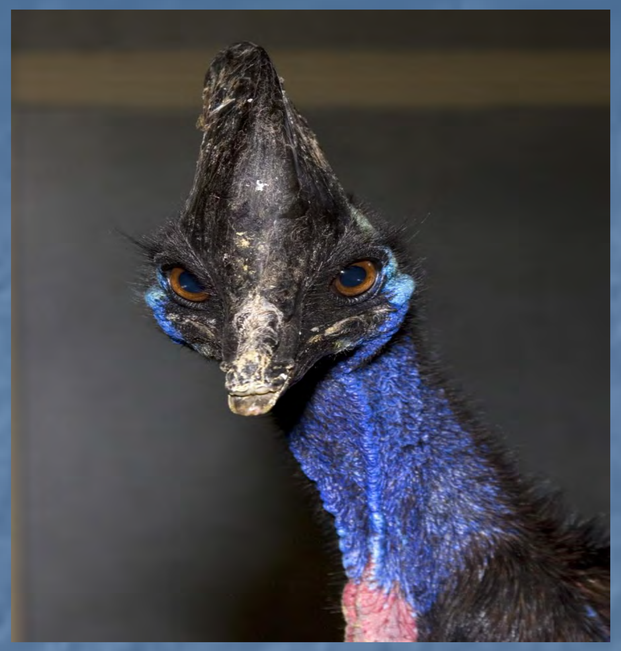
Illustration 2: Ocelots sniffing each other

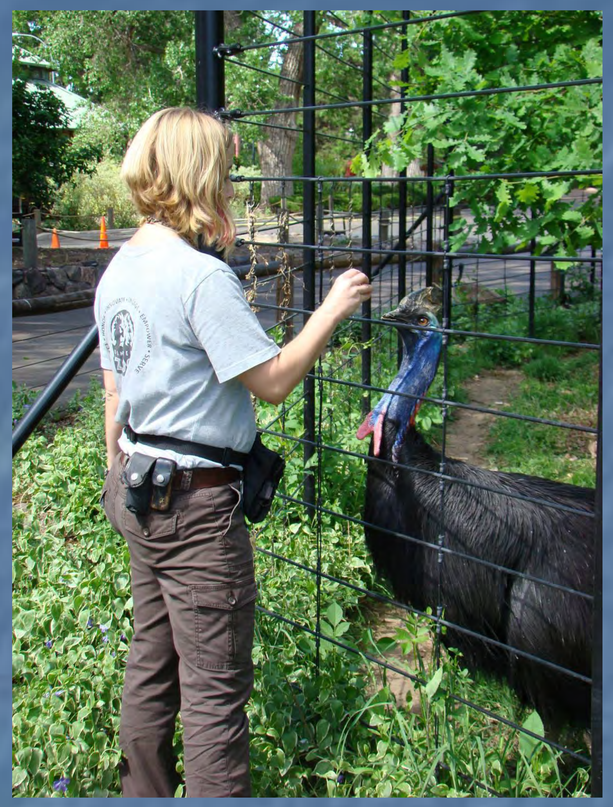
Illustration 3: 0.1 ocelot crouched, watching 1.0 ocelot walking

Training the Untrainable!

By Jennifer Nixon

Bird Keeper Denver Zoo





Introduction:

Denver Zoo received a new male cassowary in late 2008. His name is Murray and he is intensely scared of vehicles. This was discovered after he reacted poorly several times to vehicle traffic near his yard multiple times and resulted in 2 escapes. Some believed he would “get over it”. Some believed in flooding him with vehicles to desensitize him. These methods were tried and failed to produce results. The future was unclear for what to do with this animal for his well being and the safety of the guests. I attended an animal training class and gathered information that lead me to believe that the best course of action would be to take it slow and use positive reinforcement and a strong bond with Murray to help him overcome his fear.

Methods:

- Get approval for training from Curator and Supervisor.
- Meet with Curator of Behavioral Husbandry and develop a training plan.
- Work with other departments to stop vehicle traffic around cassowary yard with the exception of training situations.
- Develop a core team of trainers.
- Implement training plan.
- Incorporate a audio CD of vehicle noises during off exhibit times.
- Make adjustments to training plan based on results and bird behavior.
- Make Progress.
- Have set-backs.
- Make adjustments again.
- Have more progress.

Results:

- Murray has made a lot of progress. His recovery time after an unannounced vehicle has been reduced greatly to virtually instantaneous after the vehicle has left the area.
- His level of panic is now a low level (1/10) compared with his starting point (10/10).
- There have been no escapes since 2011. Greatly improving the safety of the bird, guests of the zoo and his keepers.
- He no longer has to be “pushed” inside on a regular basis.
- Murray has been able to have outdoor access most of the time weather dependent with exceptions for special occasions greatly improving his quality of life.
- He is becoming a calmer bird with more predictable behavior.
- Keeper learned that regardless of other peoples misconceptions about ratites, one should follow their instincts and push forward to improve the quality of animal care given to the animal and quality of life for the animal.

Thanks to John Azua and Mary Jo Willis, Andrew Fair and the Bird Department staff of Denver Zoo for their support.. Thanks to AZA Applications in Animal Training course with Marty MacPhee, Steve Martin, Ken Ramirez Emily Insalaco and Michelle Skurski.

Group Managing Birds for Show Behaviors

Jennifer Walsh and Taylor Guastella

Introduction:
This poster will examine the techniques used at the National Aviary to train groups of several different species: parrots, hooded vultures, black kites, and silver gulls. Group management and training of certain species for show behaviors has resulted in positive audience feedback and improvements in behavioral husbandry.

Methods/ Training Procedures:

Individually trained each bird to weigh, crate, and perform show behaviors.
Once Trained, started flying birds together.
Birds Trained:

6.0 Hooded Vultures - fly to stage carcass to demonstrate flock scavenging behvior.

3.2 Black Kites - demonstrate their ability to catch food out of air.

1.4 Silver Gulls - scavenge food from audience members to demonstrate hovering ability.

1.1 Scarlet Macaws, 3.1 Hyacinth Macaws, and 2.2 Green Wing Macaws - fly from permanent enclosures and fly to stage to demonstrate parrot flocking and looping behaviors.

Results/ Training Outcome:

6.0 Hooded Vultures
- Provides dramatic vulture feeding demonstration.
- Released and caught from permanent enclosure.
- Trained new weighing behaviors once all vultures housed together.

3.2 Black Kites
- Immerses audience in a natural foraging aerial display.
- Trained each bird to run into slider box to be released/ caught from permanent enclosure.
- Allowed specific bird in box to be released or caught.
- Each bird adapted to behaior in different ways.
- Trainers made exceptions for individual differences.

1.4 Silver Gulls
- Allowed multiple audience interactions.
- Crate all birds together in larger kennel crate to be released backstage during shows.

1.1 Scarlet Macaws, 3.1 Hyacinth Macaws, 2.2 Green Wing Macaws, 5.1 Blue - fronted Amazon Parrots
- Emotionally connects audience to birds and conservation message.
- Reinforced on designated perches for consistency.
- Released and caught macaws together from permanent enclosures.

NATIONAL AVIARY
PITTSBURGH, PA

Discussion/ Conclusions :

A Case for Managing Amphibians as Individuals

Jessica Nelson, M.S.
National Aquarium

Introduction

Starting in 2006, all of the amphibians in the National Aquarium's Rainforest amphibian collection (300-500 frogs, largely Dendrobatids) were photographed and accessioned as individuals, including newly metamorphosed froglets. It can be labor intensive to maintain this level of organization (i.e. froglets need to be photographed every 1-2 months), but it is well worth the effort. By tracking individuals, it is easier recognize the individual animals and their behaviors; keepers can better identify and empathize with individuals than with the group. Additionally, information can be gained from maintaining this type of dataset, which can then be used to understand long- and short-term changes in the general and reproductive health of the collection.

Daily Management Benefits

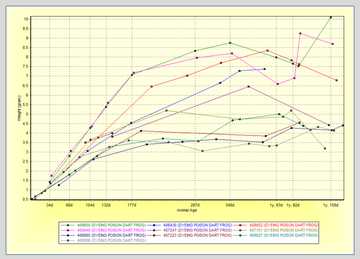
1. Prevent loss of medical or reproductive information when moving frogs around into new enclosures.

Information is kept organized through use of data sheets and Tracks collection management software.

Labels and ID photos on enclosures make it easy to quickly identify animals.

2. Record weights and body condition on a regular basis to
   - establish the ideal weight ranges for a species or individuals.
   - sex individuals.
   - evaluate success of medical treatments or husbandry changes.

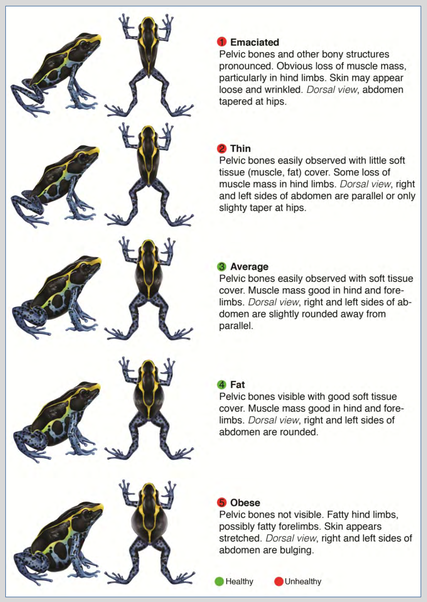
Weights of select *Dendrobates tinctorius* during the first 18 months post-metamorphosis.



Average adult (>2 yo) weights of select *Dendrobates tinctorius*.

Acc #	Sex	Avg Wt (g)	±1 Std Dev
409050	0.1	8.58	±1.78
406430	0.1	8.51	±0.98
408052	0.1	8.24	±4.54
409049	0.1	7.47	±0.77
407247	0.1	6.81	±1.15
407151	1.0	5.28	±0.40
408065	1.0	5.24	±0.87
407223	1.0	4.88	±0.62
408027	1.0	4.83	±0.99
408096	1.0	4.23	±0.73

Assess body condition scores of individuals at a glance every day, and take note of those animals scoring outside of the "healthy" range.



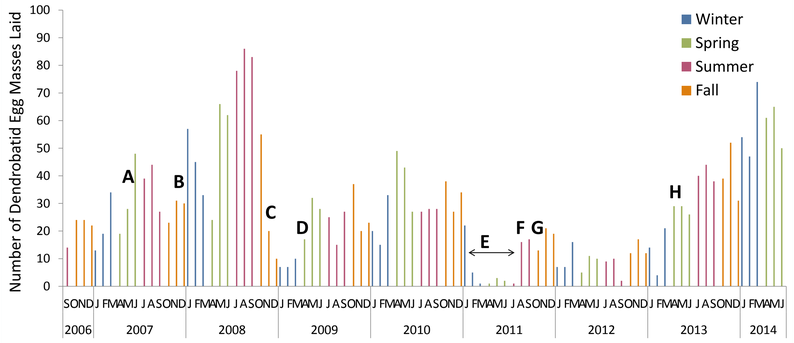
3. Document progress of minor issues that may otherwise be overlooked, worsen, and become veterinary cases.

Dendrobates tinctorius 406015 presented in November 2013 with a superficial wound (A). The foliage in the enclosure was cut back from the tank lid and the wound was photographed 12 (B) and 22 days (C) later. By 30 days (D), the wound was healed, and 7 months later the color has almost completely returned to the area.

Reproductive Evaluation Benefits

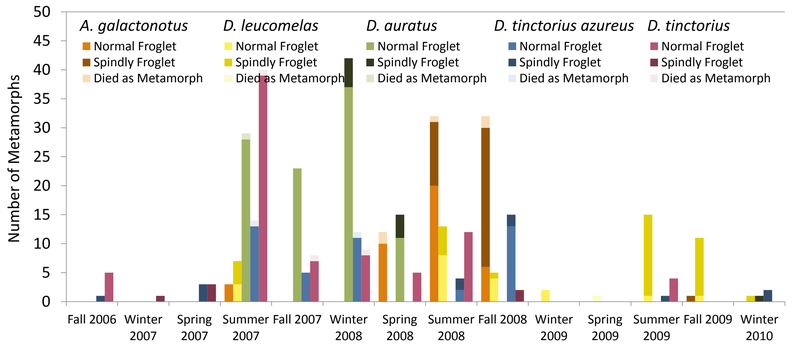
1. Observe and understand the effects of husbandry changes.

Number of Dendrobatid egg masses laid monthly from September 2006 until June 2014. Major events that may have affected reproductive health and behaviors of the parents are noted. In particular, changes to the diets of the feeder insects appear to have a positive effect on the number of egg masses laid.



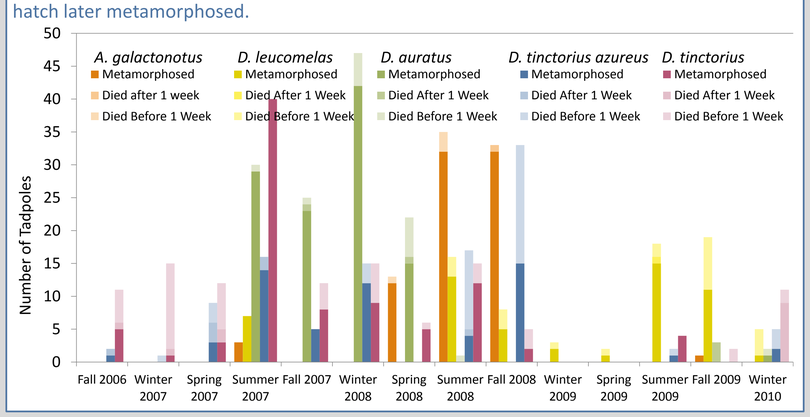
(A) Fabric leaves used in breeding dishes.
(B) Switched to Sticky Tongue Farms Miner-all supplement.
(C) Breeding dishes removed.
(D) Breeding groups remixed and dishes replaced.
(E) Chytrid outbreak and treatment.
(F) Repashy Supervite supplement started; replaced dry cricket diet with Repashy Bug Burger for pinhead crickets.
(G) Heated reservoir installed for automatic misting system.
(H) Began using Repashy Superfly media for feeder fruit flies.

The fate of metamorphs from select *Adelphobates* and *Dendrobates* species by season from Spring 2006 until Winter 2010. Since the introduction of improved supplementation of and diets for our feeder insects, the rate of spindly leg in our collection has dropped to zero.



2. Manage additions to a population more effectively.

The survivorship of tadpoles from select *Adelphobates* and *Dendrobates* species by season from Spring 2006 until Winter 2010. Almost all tadpoles that survived the first week post-hatch later metamorphosed.



Veterinary Management Benefits

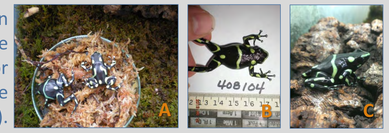
1. Prevent additional stress caused by removing medical cases from their original enclosures and social groups.

Enclosures with medical cases are clearly labeled for coverage keepers.

Animals can be treated for specific medical concerns effectively.

2. Monitor both the short- and long-term effects of treatments in order to provide the most effective and least harmful treatments.

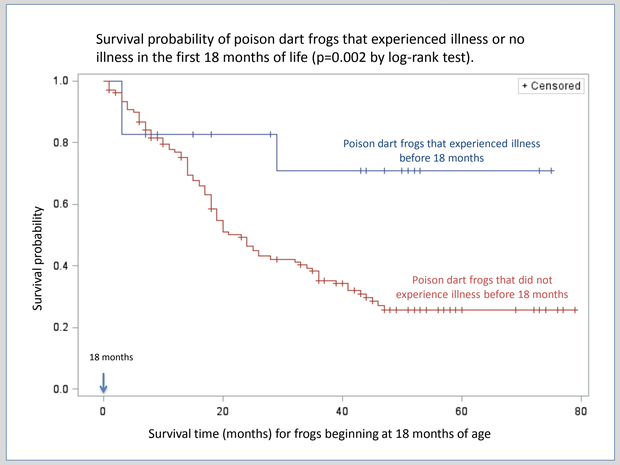
In 2009, an accidental overdose of ivermectin in several frogs (A) in our collection led to the discovery of a successful treatment plan for ivermectin overdose. Many of the survivors are still alive 5 years later (B, C).



Edema is a common problem in captive amphibians (A). We've found that by administering oral antibiotics (B) and by managing the fluid through aspiration and diuretics (C), we can successfully treat about a third of cases.

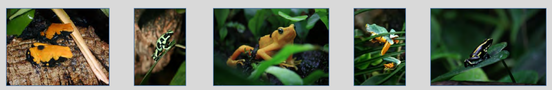
3. Provide valuable insights into the health of the captive population.

Preliminary results from a survey of poison dart frogs' survivorship past 18 months of age conducted by PhD student Brody Wehman in Dr. Laura Hungerford's lab at the University of Maryland show that what doesn't kill a juvenile poison dart frog makes it stronger.



Conclusion

The effort to individually identify amphibians improves captive management strategies as well as the capacity for retrospective reviews.



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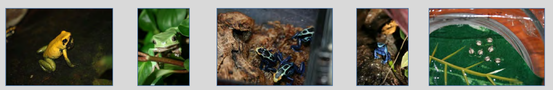
Clayton, L.A., J. Nelson, M.E. Payton, J.J. McDonnell, B.H. Rossi, K. King-Rahn, D. Woodburn, 2012. Clinical signs, management, and outcome of presumptive ivermectin overdose in a group of Dendrobatid frogs. Journal of Herpetological Medicine and Surgery 22(1-2): 5-11.

Clancy, M.M., L.A. Clayton, C.A. Hadfield, 2011. Hydrocoelom and lymphedemea in Dendrobatid frogs at the National Aquarium, Baltimore: 2003-2011. Proceedings of the American Association of Zoo Veterinarians Annual Conference, 4.



Acknowledgements · Amanda Gensemer · CJ Weaver · Ken Howell · Deb Dial · Leigh Clayton · Ben Rossi · Ben Falk · Laura Hungerford · Brody Wehman · Haley Arnold

Training 0.1 Reticulated Giraffe to Accept Oral Contraception

Jessica Real, Amy Phelps, Jessica Porterfield, & Lisa Clifton-Bumpass
Animal Care, Conservation and Research, Oakland Zoo

Introduction

Oakland Zoo manages non-breeding females with daily oral contraceptive, Melengesterol Acetate (MGA). “Mosi”, a 20 year old female, was notoriously difficult to medicate, often uncomfortable taking contraceptive sandwiches by hand. Because of this, she would come into estrus frequently due to inconsistent doses and would then illicit attention from the bull, a non-recommended pairing. Keepers attempted a variety of delivery methods but she remained inconsistent ingesting the MGA.

The Training Plan

The goal of the training plan was to reinforce Mosi for taking and swallowing an MGA jelly sandwich, which she historically had moderate success with, training her to reliably consume the medication. As this behavior was high in difficulty, Mosi’s reinforcement for swallowing a medicated sandwich was 2 bananas cut into 8 to 10 pieces.

Outcomes

- After 2-5 minutes of training 5 days per week over a 2 month period Mosi now consistently consumes her medication and is reliably contracepted.
- She has also become eager to participate in all training sessions, more readily investigates people, and is even enthusiastic about taking her MGA every morning.
- This training plan helped establish an important classical conditioning foundation for this giraffe, building positive association with keepers, and enabling great training progress with a variety of behaviors including hoof care and acupuncture.

Approximations

1. Isolate Mosi but allow visual access to herd

In the early stages of training, Mosi would not participate if any giraffe was in her space. Initially, others were shifted from her yard, but eventually training was able to be accomplished with others near by but not in proximity.

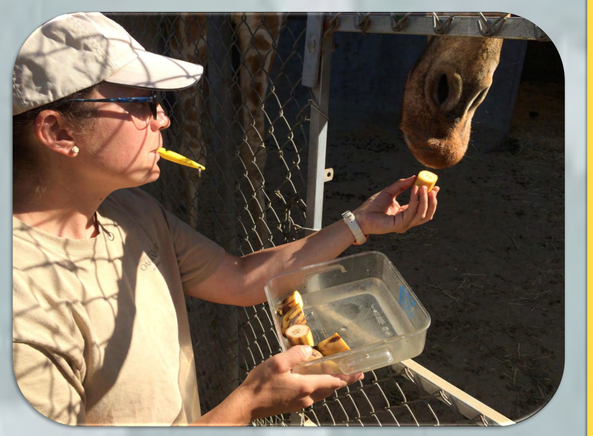
2. Food tray and trainer’s body position as cue

Mosi must swallow the sandwich before she gets her reinforcer. The sandwich must be handed to her gently and with no modifications. The tray carrying her sandwich and pre-cut bananas were used as her cue. Trainers held the sandwich in an outstretched arm and held the tray back towards their body.

3. Bridging her swallow

Historically, Mosi would take the sandwich but drop it out half chewed. Therefore, trainers bridged for Mosi swallowing the sandwich.

4. Delivering reinforcement



After the bridge, trainers handed Mosi each banana piece one by one. The behavior is maintained with a fixed schedule of reinforcement of 8 pieces of banana for swallowing one sandwich.

Special thanks to Darren Minier

The Walt Disney World Holiday Bird Count: A Great Way for Families to Connect with Nature

John Thomton, Rachel Smith, Mackenzie Pearson, Lauren Moscar, Jay Therien, Anne Savage

Disney's Animals, Science and Environment, Walt Disney Parks and Resort

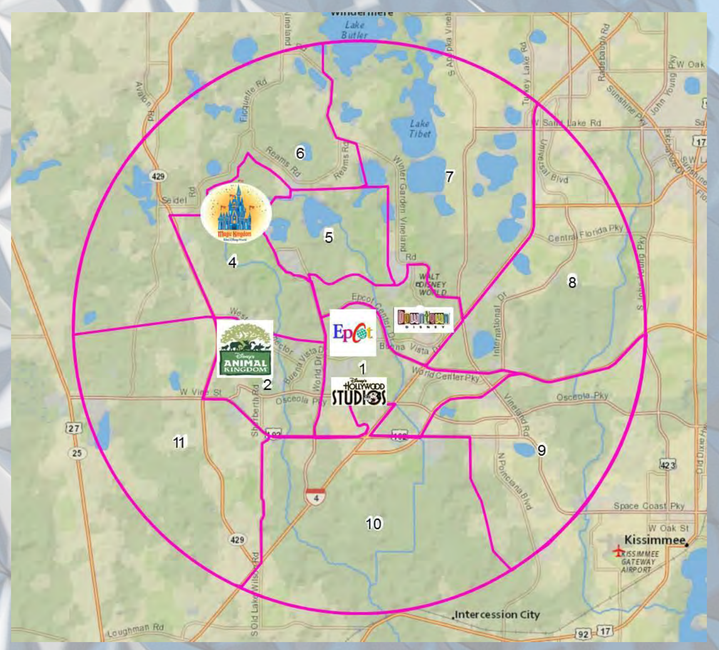
Walt Disney Holiday Bird Count

Modeled after the Audubon Christmas Bird Count, we developed a Holiday Bird Count that began in 2011 and is typically scheduled for the third week of January each year. The count circle is 15 miles in diameter and encompasses all of Walt Disney World and some neighboring areas that are known to be birding hotspots! Teams comprised of both expert and novice birders are assigned to each of the 11 zones to identify species diversity and overall bird abundance on Walt Disney World property throughout the day (pre-dawn to after sunset).

Birds found at Walt Disney World

- More than 138 bird species have been identified during our Holiday Bird Counts (2011-14) with 83,000 + individual birds counted.
- Several Florida natives as well as migratory birds have been recorded.

Chase Pickering



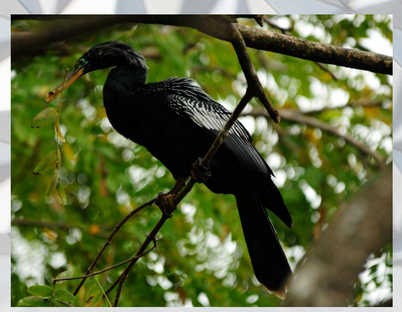
Connecting Kids and Families with Nature

Providing kids and families with nature-based experiences is important in developing lifelong conservation values. Here at Disney, we have created opportunities for cast and guests to learn about birds.

- Cast members and their families are invited to participate in our annual Holiday Bird Count and join our expert birders in learning how to identify native Florida birds .
- Guests also can join the count during Magical Moments at in park roosting sites.
- In 2013, a Family Birding Festival was added to engage cast and their families in learning about birds.
- Members of four Central Florida Girl Scout troops joined cast members in the family birding fun.

Get Your Zoo or Aquarium Involved!

- Help with a local Audubon Society Christmas Bird Count or start one of your own!
- Get your colleagues, friends, and family involved in local bird excursions



There's more than just theme parks and tourists within this count circle!

Acknowledgments

We gratefully acknowledge Cheryl Tybor, Debbie Machamer, Shannon Livingston, Stephanie Rudy, Joyce Bliem, Mike Peterson, James Mejeur, Bill Freeman, Wendy Andrew, Bill Stefancic, Joyce Stefancic, Ryan Taylor, Ted Stevens, Christy Conk, Brent Nelson, Chris Newton, Kathleen Clancy, Craig Duxbury, Wendi Fellner, Andy Stamper, and Lauren Smith for their support and hard work.

Management of Intervertebral Disc Disease in 1.0 Timber Wolf (*Canis lupus*)

Erica Mueller & Tamara Myhal, Essex County Turtle Back Zoo, West Orange, NJ

A BREIF HISTORY

In 2013, Wolf Woods at Turtle Back Zoo was home to 4.0 hand-raised, free-contact wolves, three of which had just turned two years old. In early May, Xander, the current pack omega, presented with acute ataxia of the hind legs. Using drugs to manage the pain and swelling proved ineffective and his condition worsened quickly. It was clear that he would need an MRI and possible surgery, leaving us with these hurdles:

- He was not crate trained
- Needed "cage rest"
- How would the pack deal with separation and reintroduction?
- What if he could not be fixed?
- What would his recovery look like?
- Would surgery leave him temporarily paralyzed?
- Small wolf team
- Peak heat/fly season
- Cost?

OVERCOMING OBSTACLES

We took full advantage of his status within the pack, our free contact management, and relationship with the individual.

He crated easily using his favorite snack: CHEESE!

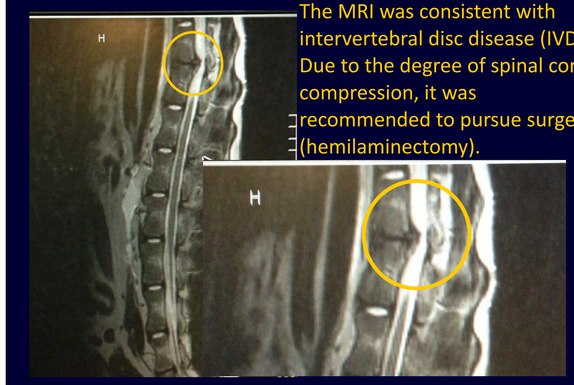
When separated, the rest of the pack still had visual contact which we hoped would help with re-introductions.

New keepers were quickly introduced.

At NorthStar VETS

DIAGNOSTICS

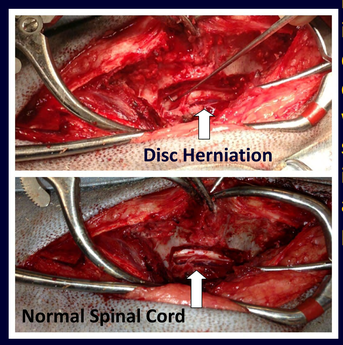
The MRI revealed extradural compression of the spinal cord at the level of T13-L1. The compression was leading to significant deviation of the spinal cord to the right side of the canal. The disc space in that area was collapsed and there was decreased signal intensity consistent with a herniated disc. The protrusion was predominantly midline and ventral to the spinal cord. Cranial to the compression, there was a T2 hyperintesity in the spinal cord -intramedullary consistent with syringohydromyelia, likely secondary to the chronic compression of the spinal cord.



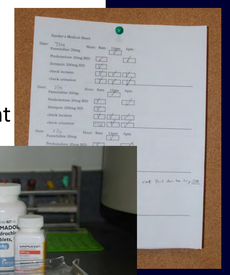
The MRI was consistent with intervertebral disc disease (IVDD). Due to the degree of spinal cord compression, it was recommended to pursue surgery (hemilaminectomy).

SURGERY

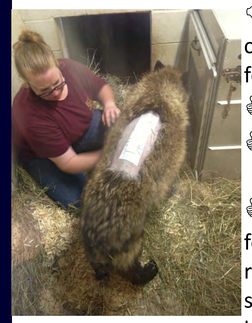
A week after the MRI, Xander was again transported to North Star VETS where a hemilaminectomy was performed to remove the herniated intervertebral disc and decompress the spinal cord. Once the disc was removed, the spinal cord returned to its normal position, allowing the healing process to begin.



The Rocky Road to Recovery



- **6/28** SURGERY DAY– That evening, he was ***standing*** in the crate!
  We set up 24 hour watch/care and pain management schedule
- **6/29** Let out of crate, ***urinated*** on his own!



- pm...presented challenges by refusing food/meds
- **6/30** Splashed in tub
- **7/1** Tried to ***jump!***
  (Keepers no longer needed for over-nights)
- **7/3** Removed bandage and transdermal fentanyl patch; rolled over for belly scratches; moved to bigger pen

- **7/4** Presented with lesions (pressure sores) on hips and rear end

The next 2 weeks were spent managing the lesions that would come and go and weaning him off medications

- **7/30** Swelling at incision site, additional medication prescribed
- **7/31** ***Trotted*** in pen
- **8/7** Discontinued medical treatment
- **8/14** Moved to even larger space; appetite improved

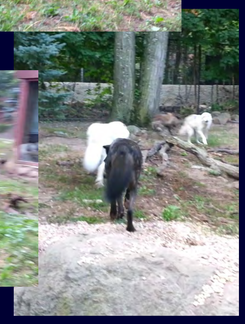
[side note: his brother, Theo, had surgery to remove a cystic kidney and was recovering next door]

- **8/20** Xander and Theo reintroduced in an off-exhibit holding area
- **8/21** All reunited in exhibit. Could not have gone any better!

Reintroduction…

The moment of truth!

With fingers crossed and breath held, we opened the doors and what happened next was amazing!



What Xander has taught us…

- Nothing is impossible!
- Sometimes your plan needs to look like a flow chart!
- Teamwork and good communication are key
- Ignore negativity
- NEVER GIVE UP!

One year later

NEED MORE?

Scan here to see videos

CONTACT US…

Erica Mueller, blueocean92082@optonline.net
Tamara Myhal, t_myhal@yahoo.com

Acknowledgements

- Jonathan Bergmann, DVM, Turtle Back Zoo
- Melissa Logan, Ph. D., DVM, DACVIM, NorthStar VETS
- Garrett Levin, DVM, DACVS, NorthStar VETS
- The Zoological Society of New Jersey
- NorthStar VETS, Robbinsville, NJ

The Use of Animal Biofacts from One Species to Another for Enrichment in AZA Facilities

Kaitlyn Whisman. Santa Fe College Teaching Zoo, Gainesville, FL 32606

INTRODUCTION

This study allows other keepers to see how biofacts for example, feathers or sheds from one species, can be utilized as enrichment for a different species.

OBJECTIVE

- To show how biofacts as enrichments can be implemented safely.
- To investigate if any facility has provided biofacts with predator and prey relationships.
- To display how biofacts for enrichment has been successful in other AZA facilities.

EXPERIMENTAL DESIGN

- A survey was created and sent to the behavioral departments and enrichment coordinators of numerous AZA facilities in order to find out if providing biofacts from one species to another can be a safe and valuable form of enrichment in AZA.
- 100 responses were received and reviewed. Some facilities may be represented more than once because the survey may have been sent to different individuals within the same facility.

OVERALL ANALYSIS

Out of those surveyed, a whopping 96.97 percent use biofacts from one species to another species for enrichment.

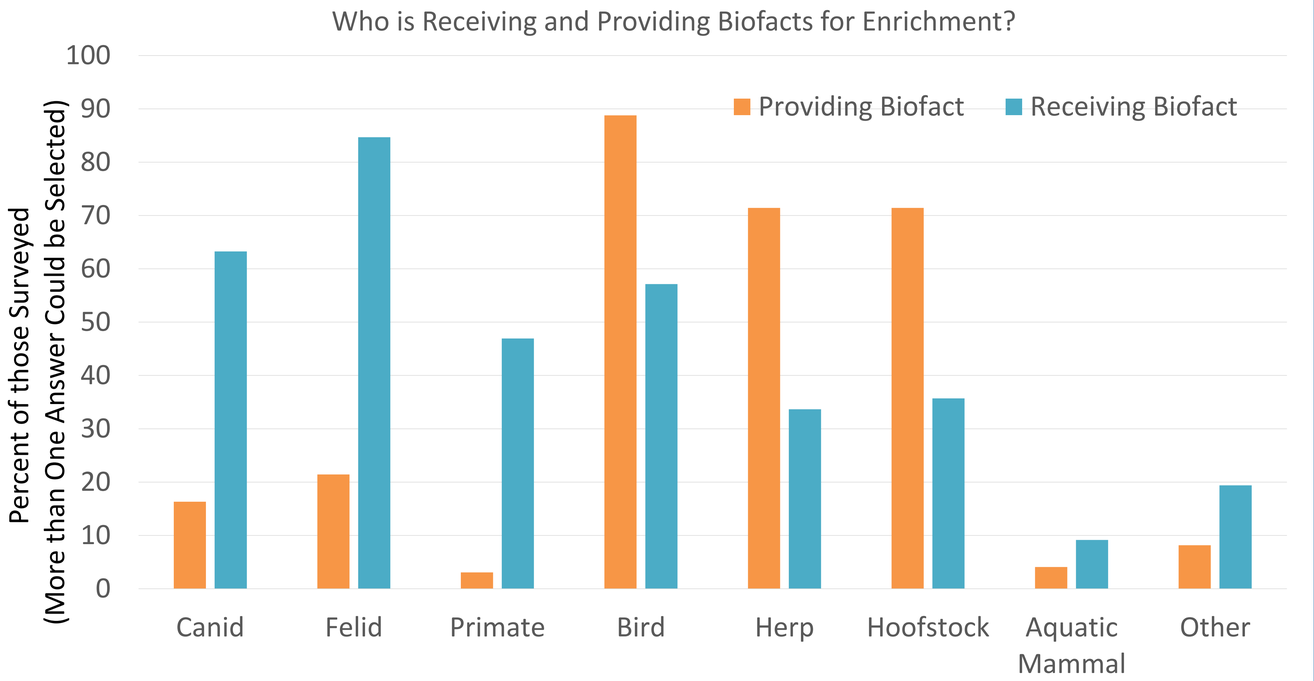
Biofacts are mostly being taken from birds, reptiles, and hoofstock to be given to other species. The most common items being used for enrichment are feathers, reptile sheds, fur, wool, hoof trimmings, antlers, used bedding, and items that have been scent marked. There were some items being taken from carnivores but it was rare to see items taken from primates and aquatic mammals.

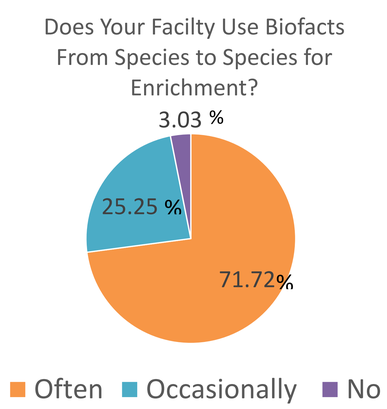
The majority of these biofacts are given to carnivores, especially the felids. Not as frequently (in order of given to most often to least often), biofacts are given to birds, primates, hoofstock, herps, and rarely aquatic mammals.

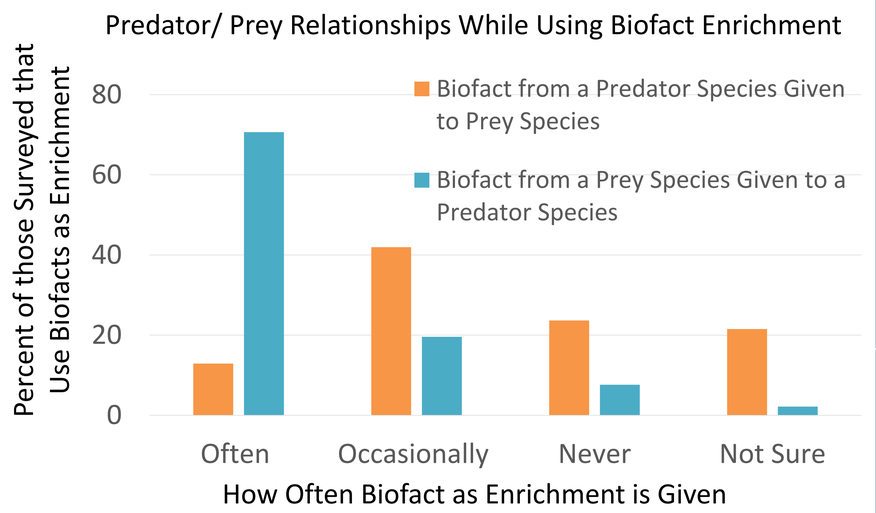
57.73 percent of those surveyed stated that the enrichment met goal. Only 1.03 percent said that the enrichment did not meet its goal.

WHAT ARE FACILITIES DOING?

- “Rubbing shed bison fur on logs/trees/rocks in wolf exhibits has been successful”
- “Live mealworms or crickets in a whole snake shed for mongoose species is an extremely effective enrichment.”
- “Our seabirds enjoy turkey vulture and pelican feathers as enrichment.”
- “Raw eggs (bird and reptile.)”
- “Deer antlers are used a lot for investigation and chewing”
- “We use hair/fur from our hoof stock and give it to our felids, canids and bears. Also we use hoofstock's bedding (straw, shavings).”







Ball python with antler

Short tail opossum with feathers in tail

Scheltopusik with snake shed in scent container

PREVENTING DISEASE TRANSMISSION

When those who do not use biofacts were asked why not, the only response checked was disease transmission or veterinary restrictions.

In order to prevent disease transfer when using biofacts as enrichment, 84.27 percent of facilities freeze the item. Amount of time the biofacts spent in the freezer varied by institutions ranging anywhere from three days to three weeks. 24.72 percent of facilities surveyed leave items in the sun to kill bacteria and 28.09 percent use a disinfectant or sanitizer. The remaining percent do not use biofacts. Autoclaves are also used in a good number of institutions.

Some facilities use urine and feces from one species to another for enrichment. Precautions for providing these items include making sure animals are up to date on their fecal and vet procedures, using tubes to place the item in, and not providing biofacts to the same species.

An example of an autoclave that may be used to prevent disease transmission.

KEY FINDINGS

It turns out that many zoos are utilizing biofacts for enrichment purposes and the majority of these enrichments are meeting their goals. Marine mammals utilized biofacts the least but there are some available options such as pelagic bird feathers or seal molts. Surprisingly primates provided the least biofacts. There is no one uniform way to prevent disease transmission when using biofacts, although, there are multiple available options.

ACKNOWLEDGEMENTS

Jonathan Miot for his assistance on the project

Real feel temperatures inside program animal transport coolers for reptiles

Kaya Forstall - Keeper I, Program Animals
Zoo Atlanta

Introduction

- Reptiles travel to programs in insulated coolers.
- Animals can be away from home enclosure for a maximum of 5 hours.
- Per species temperature guidelines are in place based natural history for use during outdoor programs.
- A designated thermometer is outside of holding as a reference.
- Location requirements:
  - Outdoors – coolers kept in well shaded area
  - Indoors – coolers kept in temperature regulated room
- We measured the temperature inside the coolers in:
  - Direct sunlight
  - A well shaded area
  - A room with a set thermostat
- Do we need to reevaluate the temperature range each species can be used in outdoor programming?
- Important for animal welfare.

Protocol states :

"…on a warm day, make sure the carrier is sitting in a well shaded area."

AND

"Avoid direct sunlight, wind, and rain when presenting animals."

Hypotheses

In the sun, the inside of the coolers:

On a cooler day, would remain a comfortable temperature slightly warmer than the outside temperature.

On a warmer day, would increase to a highly unsafe temperature higher than the outside temperature.

In the shade, the inside of the coolers:

On a cooler day, would stay around the temperature outside of the cooler.

On a warmer day, would stay around the temperature outside of the cooler.

Inside a temperature regulated classroom:

The temperature inside the cooler would not deviate very much from the set thermostat.

Supplies

- 2 "E" coolers (largest size cooler - 18-1/4" x 31-1/2" x 16")
- 2 "B" coolers (smaller size cooler - 12.375" x 17.375" x 13.25")
- 4 Ambient Weather WS-02 Indoor/Outdoor with Probe
- 1 stationary outdoor thermometer
- A location in direct sunlight
- A location in the shade
- An indoor room with set thermostat
- http://www.wunderground.com/history/airport/KPDK/2014/6/29/MonthlyHistory.html#calendar (for High/Low temperatures, humidity, and hourly temperatures)
- 1 Clock/Watch

Above: "E" cooler
Below: "B" cooler

Ambient Weather WS-02 Indoor/Outdoor with Probe

Animal handler outdoors with "B" cooler

American alligator in "E" cooler

Ball Python in "B" cooler

Methods

- 2 warm days in September
  - Day 1: High 82, Low 53, Day 1: High 84, Low 61
- 2 cold days in January
  - Day 1: High 47, Low 23, Day 2: High 38, Low 25
- 2 days in closed room with a set thermostat
  - Day 1: set to between 69-72, Day 2: set to 72
- Cooler lids closed with an indoor/outdoor thermometer. Probe inside cooler.
- Log temperature on ambient weather thermometers at each cooler every hour for a 5 hour duration (including start time)
- Each day outdoors:
  - Log high and low temperatures and percent humidity
  - 1 "E" and 1 "B" cooler in direct sunlight. 5 hour duration.
  - 1 "E" and 1 "B" cooler shaded area. 5 hour duration.
- At every hour (including start time):
  - Log stationary outdoor temperature
  - Log hourly temperature per internet source
  - Log temperatures on the ambient weather thermometer at each cooler

Calculate the difference in temperature between the inside and outside of the coolers.

Calculate the difference in temperature between the handler thermometer and the temperature on the website.

Calculate the difference in temperature between the coolers in the sun, shade, and indoors.

Results

- Temperature increased significantly inside coolers in direct sunlight
- Temperature did not significantly change inside coolers in the shade and indoors
- Significant difference between inside and outside coolers only in the sun during both warm and cold seasons
- No significant difference between the outdoor thermometer readings and the online hourly forecast
- In the sun, the temperature increased with duration.
- In the sun, the temperature increased significantly within the first 2 hours.

Acknowledgements

Program Animals staff at Zoo Atlanta:

- Rebecca Bearman, Assistant Curator Birds and Program Animals for the concept and helping to develop the methodology .

- Christina Lavallee, Lead Keeper for assisting with analyzing the results.

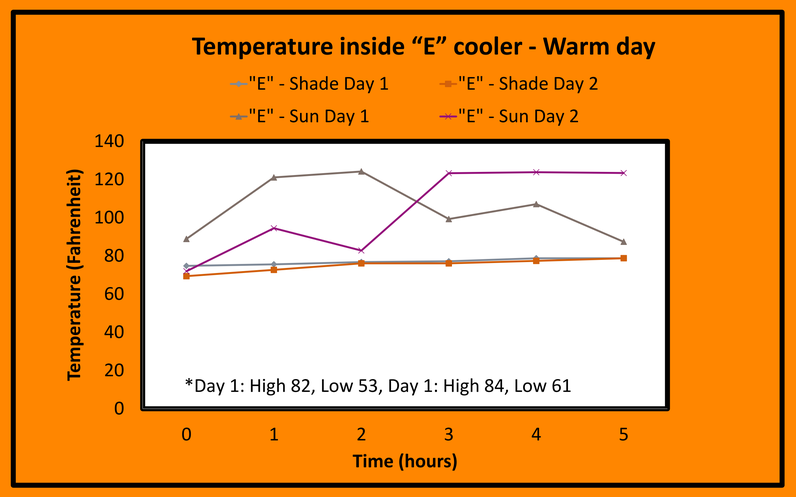
- Briel Ritter, Keeper I, Georgette Suleman, Keeper II, Caroline Ledbetter, Keeper III for helping with execution and checking coolers hourly and temperatures hourly.

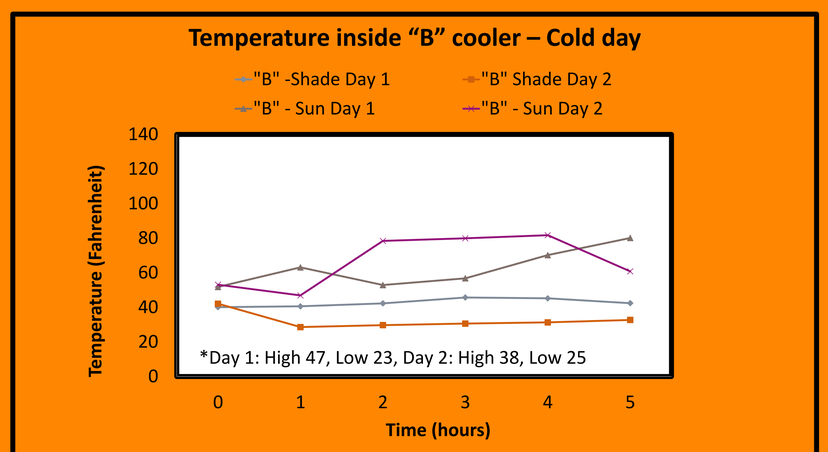
Other acknowledgements:

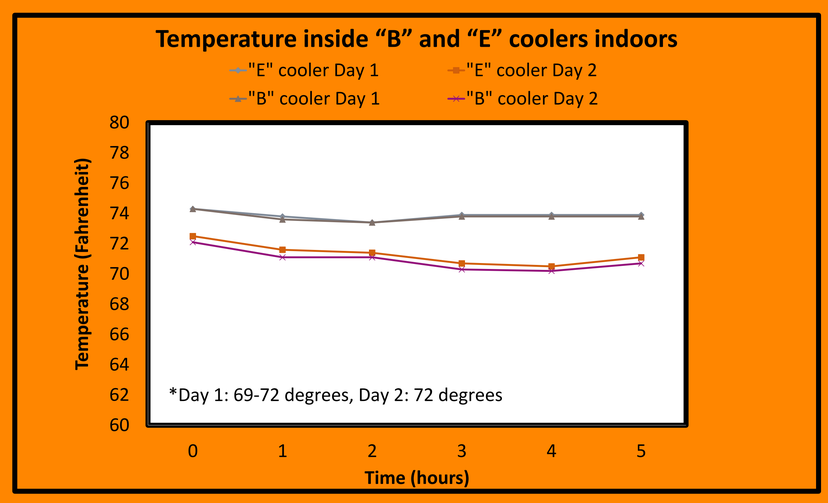
Regina Gazes, PhD – Post Doctoral Fellow in Primate Research at Zoo Atlanta for helping develop the methodology.

Several Zoo Atlanta interns and teen volunteers for helping check coolers regularly.

Graphs







Discussion

Significance of findings

When outdoors, animals and transport containers should remain in shaded areas. When indoors, thermostats should be ON and on appropriate settings.

As long as these protocols are followed, the species specific temperature range guidelines do not need to be updated.

Moving forward

Inform animal handlers of findings so they can assist keepers with maintaining good animal welfare practices as the animals travel to and from programs.

Collect same data with mammal crates and kennels

Now You See Me:

An investigative study on improving tortoise visibility within enclosures

K.E. Grigg & K.C. Lewis, Santa Fe College Teaching Zoo, Gainesville, FL, 32606

INTRODUCTION

•Guests don't generally come to zoos to see tortoises, probably because they aren't seen as charismatic animals. However, they can be charismatic in their own way.
•If tortoises were more visible, guests could have a better opportunity to see how interesting they are.
•The survey of literature found very little material relating to tortoises and enrichment.
•This study looks at the affects of two different enrichments on Red-footed tortoise (*Chelonoidis carbonaria)* visibility to the public.

OBJECTIVE

•To enhance the activity level of tortoises through the use of enrichment, ultimately increasing visibility to the public.

METHODS

•Data was collected on 1.4.3 Red-footed tortoises, located in two mix species exhibits. Collection would begin at 9:00a.m. and continue every half hour for two hours.
•The study occurred over a five week period in the months of May and June 2014.
•Weeks 1, 3, and 5 were baseline weeks.
•Weeks 2 and 4 were weeks when enrichment was implemented.
    •First enrichment: Wallow
    •Second enrichment: Open-sided box
• For each time of data collection, the tortoises were assigned one of four colors to signify how visible they were from the public trail (*see Table 1).*

Table 1. Meaning of colors

Color	Description
Red	Animal is not visible to the public.
Yellow	Animal is not clearly visible and may be looked over by a member of the public.
Green	Animal is clearly visible to the public.
Blue	Animal is clearly visible and moving.

ACKNOWLEDGEMENTS

Thank you to the Santa Fe College Teaching Zoo staff for the opportunity to perform this study.
Thank you to my fellow keepers for their assistance.
Thank you to Jonathan Miot for his oversight.

Example of "Blue"

Example of "Green"

Example of "Yellow"

Example of "Red" (Tortoise is in back area)

Fig. 1: Percentage of visibility for all Red-Footed tortoises by week.

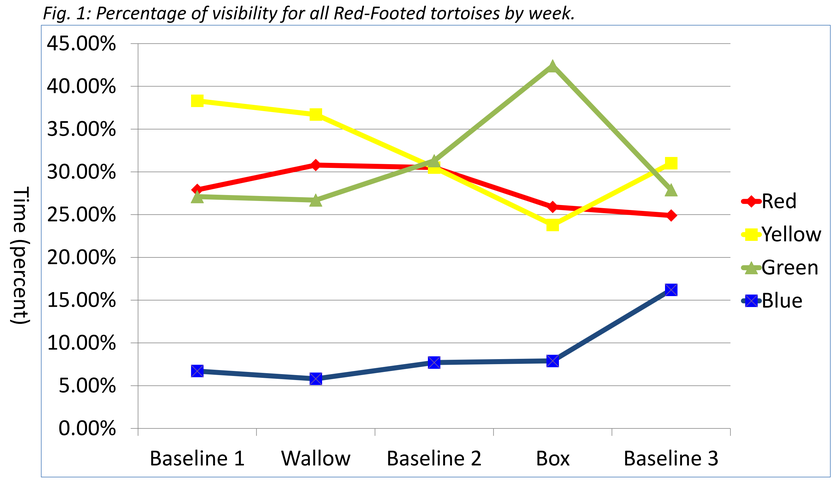
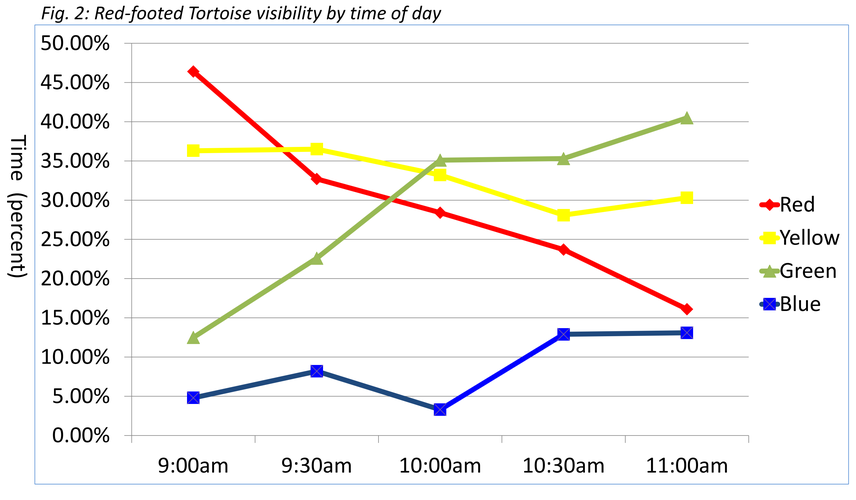


Fig. 2: Red-footed Tortoise visibility by time of day



RESULTS

•The overall trend from week to week showed an increase in tortoise visibility during the box enrichment week. (*see Figure 1*)
    •The tortoises went from being visible about 31% of the time during the wallow enrichment week to being visible about 50% of the time during the box enrichment week.
•A trend was found between the time of day and how visible and active the tortoises were. The tortoises were more active and therefore more visible later in the morning each day , peaking at 11a.m.(*see Figure 2).*
•The wallow enrichment seemed to have little affect on the tortoises.
    •Their visibility actually decreased that week by 2%.
•There was a correlation between age and visibility:
    •The juvenile tortoises were visible on average 29% of the time, while the adults were visible on average 42% of the time.

DISCUSSION

•Tortoises seek shelter by hiding in the roots of a tree or by burrowing against ground props, making it almost impossible to distinguish them from the surroundings.
    •The box enrichment was successful because it appears the boxes gave them a sense of shelter, however keepers could orient the boxes to allow tortoises to be viewed by the public.
•Time of day appears to have affected their visibility because it is closely linked to temperature. The temperatures would gradually increase 10-20°F throughout the morning , generally settling on temperatures of 85-90°F by 11:00am.
•The wallow enrichment had little affect on the tortoises, which could have been caused by the nightly rains that occurred that week.
•The juvenile tortoises may have been less visible than the adults due to a difference in their enclosures.
    •The adult red-foots have more square footage of open space, while the juveniles have more plants and props in which to hide.
•Due to the school schedule within our Teaching Zoo, it was impossible to collect times in the mid-day and afternoon. As a follow-up study it would be beneficial to look at more times throughout the day. It would also be good to look at other enrichments, over a longer period, as well as perform preference tests for various enrichments.

The NCAAZK Mini-Conference: Facilitating Regional Cooperation Amongst Local AAZK Chapters

Lauren Augustine[1], Chelsea Grubb[1], Elise Bernardoni[2], Hilary Colton [1] and Kenton Kerns[1]

[1]Center for Animal Care Sciences, Smithsonian National Zoological Park, 3001 Connecticut Ave NW, Washington, D.C. 20008, USA.
[2]Senior Manager of Education Programs, Friends of the National Zoo, Smithsonian National Zoological Park, 3001 Connecticut Ave NW, Washington, D.C. 20008, USA.

"The Science Behind Animal Keeping"

In February 2014 the National Capital AAZK chapter held a regional conference at the Smithsonian National Zoological Park.

The conference theme, "The Science Behind Animal Keeping," was chosen to promote participation from keepers working with all taxa.

The goals behind this conference were: :

1) to increase sharing and cooperation between local institutions;
2) to provide zoo professionals with a comfortable venue to practice presenting;
3) to give zoo professionals an opportunity to socialize with their peers.

The one-day regional conference was held in the National Zoo's Visitor Center Auditorium and started at 3pm and ended at 9pm.

A **$5 admission fee** was charged to cover the cost of food and beverages provided during breaks. A number of vendors donated goods gratis or at a reduced rate. Organizers reached out to other facilities within a five-hour radius from Washington, DC and encouraged them to attend and present..

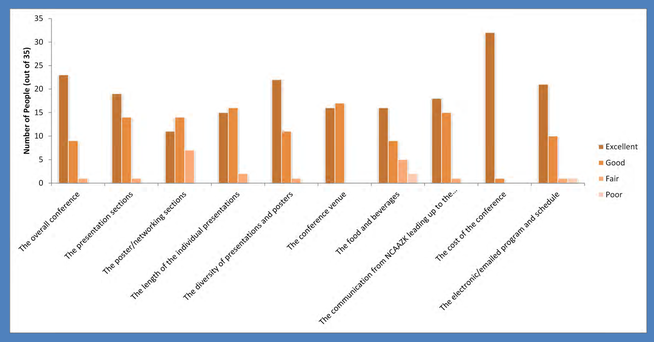
Outcomes

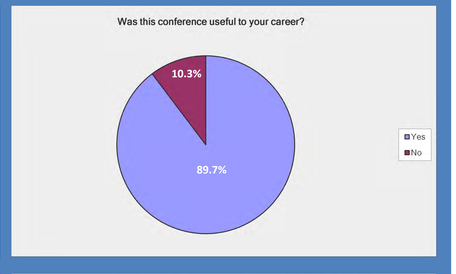
In attendance were **120 keepers, interns, volunteers, and other staff representing nine different facilities** within a five-hour radius from Washington, DC..

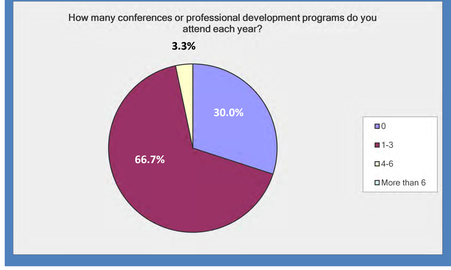
The conference was comprised of **17 formal presentations and 25 poster presentations.**

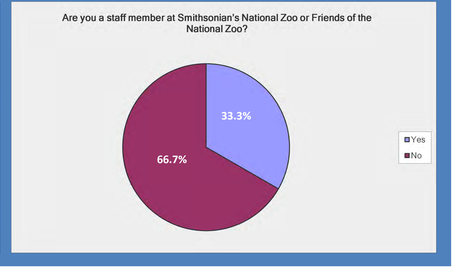
A post-conference survey was distributed to the participants in order to evaluate the experience. The results of this survey will be used by the NCAAZK conference committee to create an even more productive and efficient event in the future.

Follow up survey responses:









Future Goals

NCAAZK plans to host a regional conference in 2015.

NCAAZK hopes to encourage nearby chapters and facilities to host this regional conference annually.

Improve food and beverage options and sponsorship opportunities.

Increase number of institutions attending and participating.

Include time for tours around the host institution.

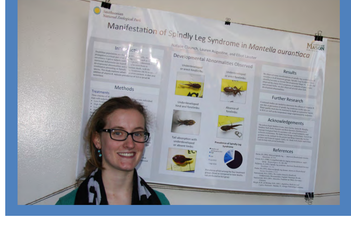
Extend the conference schedule to allow for more presentations, poster sessions, and break times.

Based on the post-conference survey and conversations with attendees, NCAAZK feels strongly that the regional conference was an enormous success.

100% (37 individuals) of responders would attend another NCAAZK regional conference.

100% (34 individuals) of responders would recommend attending a future NCAAZK regional conference to a colleague.

100% (34 individuals) of responders would recommend presenting at a future NCAAZK regional conference to a colleague.



Acknowledgements

We would like to thank the Smithsonian National Zoological Park for providing the space and equipment to host this event. Additionally we would like to thank the several volunteers that helped plan, promote, set up, moderate, photograph, bartend and clean up the event. Lastly we would like to recognize Lost Rhino Brewing Company, Subway and Trader Joes for providing the food and drinks for this event.

CATOCTIN WILDLIFE PRESERVE & ZOO

DEVELOPMENT OF A NUTRITIONAL PROGRAM FOR THE OMNIVOROUS/HERBIVOROUS REPTILES AT CATOCTIN WILDLIFE PRESERVE AND ZOO

Mario Lawrence, Don Middaugh, Jason Noble and Debbie McClelland

PURPOSE:

To discuss the development of diet protocols at Catoctin Wildlife Preserve and Zoo. We wanted to look at the history of zoo diets, current science and protocols/issues that occurred during the changes such as dealing with dietary addictions and where we hope to proceed.

EXCERPTS ON ZOO DIETS IN HISTORIC REFERENCES:

Gerald Durrell – The Stationary Ark. 1976

"It was the brilliant gourmet, Brillat-Savarin, who said 'Tell me what you eat and I will tell you what you are'. This rule unfortunately cannot be applied to animals. Neither can the reverse, because simply knowing what an animal is merely puts it into a very rough gastronomic category, which takes into no account of its personal likes or dislikes, or indeed our ignorance of its diet in the wild state. Thus you will get an animal, Classified by textbooks as 'strictly vegetarian, which has a tremendous hankering for fish or meat, and a 'strictly carnivorous' animal who will behave with drooling idiocy at the sight of a bunch of grapes.'

I.B. Murphy and Joseph Collins wrote in A Review of the Diseases and Treatments of Captive Turtles 1983

"After attention has been given to the proper physical environment for maintenance of captive turtles and tortoises, it is essential to provide a properly balanced diet with the necessary vitamin and mineral constituents. Many turtles perish simply because of an inadequate diet, particularly if their food sources are the prepared commercial turtle foods....."

Sulcata tortoise (Centrochelys sulcata) investigating a box of crickets

Some of the main resources used in this project

AFTER RESEARCH:

After a bit of research (which is continually being changed and updated) we began to formulate our diet protocol – taking into consideration the following:

Some of our references

VITAMIN RUN DOWN:

- Calcium – essential for healthy bone development. Especially important for growing hatchlings and females forming eggs. Lack of calcium leads to metabolic bone disease, soft shell, bone deformities and sometimes even death.
- Vitamin D – allows the body to absorb calcium and allows the body to maintain a proper balance of calcium and phosphorus. If the animal spends several hours a day in direct sunlight, it does not need to be supplemented.
- Vitamin A – fat soluble vitamin (retinol) that helps maintain a healthy immune system. Important for skin and eye health, and surface tissues that secrete mucus. If not enough vitamin A is provided Hypo-vitaminosis occurs. If too much supplemental vitamin A is provided it can be devastating and very painful.
- Vitamin E – fat soluble, anti-oxidant protects against disease. Vitamin E and selenium deficiencies may result in weakness of the limbs.
- Vitamin K – necessary for clotting of blood
- Vitamin B1 (thiamine) – converts blood sugar to energy. Also necessary for healthy immune system and healthy nervous system.
- Vitamin B2 (riboflavin) – important for skin and eye health. Turns carbohydrates into energy. Deficiencies can lead to skin and eye problems and stomatitis and weak muscles
- Vitamin B3 (niacin) – important for healthy nervous system. Deficiencies can cause mouth and digestive problems
- Vitamin B5 – immune system health. Deficiencies can lead to nerve problems, slow growth and problems with immune and respiratory systems.
- Vitamin B6 – immune system. Helps utilize proteins and essential to some brain functions
- Vitamin B12 – nervous system. Aids in production of new cells. Closely related to Folic acid. Can be an appetite stimulant.
- Folic acid – necessary for cell development and division. Deficiencies can cause anemia, intestinal disorders and swelling of the tongue.
- Vitamin C – can help in times of metabolic stress such as respiratory illness or stomatitis.
- Biotin – metabolizes fatty compounds during growth.
- Choline – prevents fats from accumulating in the liver.
- Inisotol – aids in metabolism of fats.
- Fiber – essential in a herbivorous tortoise's diet. Helps retain moisture and aids in digestion.
- Protein – found in both plants and animals. Proteins must be properly provided for the species of animal. Too much of the wrong protein can put a strain on the kidneys and lead to kidney failure.
- Other vitamins – sodium, iron, copper, cobalt, iodine, manganese and selenium are also usually found in prepared vitamin supplements.

ANTI NUTRIENTS

CAUSES OF PYRAMIDING

- Improper diet – frequently too much improper protein
- Hydration
- Lack of proper lighting
- Inadequate supplementation – vitamins and minerals
- Lack of proper space
- Stress – environmental, disease/parasites
- Possible genetic factor

Hydration Hay and Tortoise Block have been very popular with our chelonians

SO WHAT IS THE IDEAL DIET?

KNOW YOUR SPECIES NATURAL HISTORY!!

GRASSLAND

Hatchling Leopard Tortoises (Stigmochelys pardalis babcocki)

Cactus and fruit – shown: opuntia cactus and welding gloves

MAKE SURE APPROPRIATELY SIZED TO AVOID INJURIES.

OMNIVORE

Elongated Tortoise (Indotestudo elongata)

CARNIVORE

Mata mata (Chelus fimbriatus)

OTHER

Painted Terrapin (Rhinoclemmys pulcherrima)

GRAZING - BROWSE

BETTER FOR THEM AND FREE!

Desert Tortoise (gopherus agassizii)

ISSUES DURING THE CHANGE OVER

SUCCESS IN BREAKING DIETARY ADDICTION!

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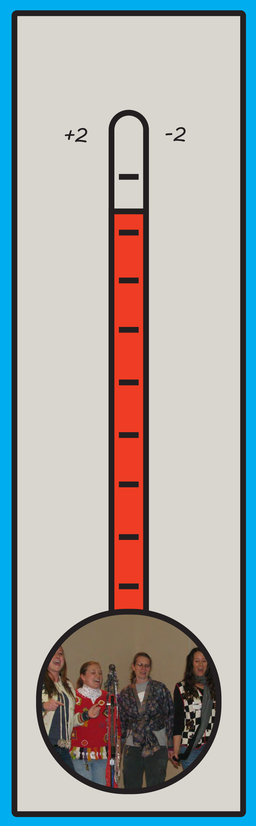
- Jim Murphy, Lauren Augustine, Matt Neff and the rest of the staff at the Reptile Discovery Center, National Zoological Park for their help putting this paper together
- Jennifer Parsons, Nutritionist, San Diego Zoo
- AAZK for giving us this forum to share ideas and the project we are working on

Polar Bears International Keeper-led Initiatives

"Congratulations!
Today is your day.
You're off to great Places!
You're off and away."



Thermostat Challenge

Join other ambassadors to reduce CO_2 on International Polar Bear Day!
Engage your family, schools, businesses, and your own institution.
This year many ambassadors held funky sweater parties to bundle up for bears!

Reuse Campaigns

Eco-art displays show individual actions making a lasting impact!
View these pieces at the North Carolina Zoo, Alaska Zoo,
Cleveland Metroparks Zoo, Maryland Zoo in Baltimore,
Sea World San Diego, and coming soon to Milwaukee County Zoo.

Acres for the Atmosphere & trees for you and me

Trees are "Carbon Sinks" that absorb CO_2 from the air!
11 Chapters raised $6,692 last year for local planting projects.
Join us in 2015 with an option to donate to international planting efforts.

Marissa Krouse, Program Manager, Polar Bears International
marissa@pbears.org
Heather Kalka, Zookeeper, Toronto Zoo
acres@pbears.org

Cycle for Change

This bike commute challenge has had 9 teams bike 10,200 miles over the past 2 years!
Look who's leaving the car at home and reducing carbon emissions:
Sequoia Park Zoo, Lincoln Park Zoo, Oregon Zoo, Oregon Metro,
Como Park Zoo, Columbus Zoo and Aquarium,
Kansas City Zoo AAZK, Philadelphia Zoo, Louisville Zoo
and Milwaukee County Zoo.

"Oh, the places you'll go!"

A “Flamingle” for All Seasons

Creating an Enriching Environment throughout the Year

MARK McDONOUGH, *Pittsburgh Zoo & PPG Aquarium*

PITTSBURGH ZOO & PPG AQUARIUM

FLAMINGO SOLARIUM

Before 2013, the only way visitors to the Pittsburgh Zoo & PPG Aquarium were able to view and learn about the Caribbean flamingos (*Phoenicopterus ruber ruber*) was when the temperature was above 40° Fahrenheit. We wanted to find a way for visitors to see these animals all year long. We came up with a way to modify their bedroom area and installed a sunroom with heated floors to the existing building. This not only helps visitors see the birds all year long, but also gives the flamingos natural sunlight during the winter months. The heated floors also helped to prevent cracks from forming on their feet.

“FLAMINGLES”

In order to educate the visitors on Caribbean flamingos and give them an interactive experience, we started bringing our flock of 10 birds out onto the visitor’s pathway. This allows the birds to move around and explore outside their normal habitat. We have a few friendly individuals in the flock that we are able to let the kids touch. During the walks, keepers talk about flamingos, their habitats, and their behaviors in the wild, as well as at the zoo. The “Flamingles,” as we call them, are a big hit with both visitors and the birds.

FLAMINGO FEEDER

Because of the popularity of the “Flamingle,” The Ellis School’s engineering students got together with the keepers to help create a new way to feed our flock. Through many conversations and lots of hard work, they designed what looks like a tree trunk in which we can hide the flamingo’s food bowl. The stump feeder is high enough to prevent wild ducks from eating all of the flamingo’s food.

How to mix banded mongoose using Vick's VapoRub® (Mungos mungo)

Nancee Hutchinson - Lead Small Carnivore Keeper
Fort Wayne Children's Zoo

Banded mongoose are a very social species that rely heavily upon scent for identification. When trying to mix two or more banded mongoose together that have a history of aggression or are new to each other, Vick's VapoRub® can be a useful tool to use to basically "erase" their identities.

The first step in the introduction or reintroduction process should be to house the mongoose on opposite sides of the enclosure mesh so they can see, smell and hear each other. This should be done for 2-4 weeks or until all aggression thru the mesh has subsided. Once this happens you can begin mixing.

The day of the mixing everything in the enclosure should be disinfected thoroughly and plenty of enrichment and puzzle feeders should be given to keep the mongoose occupied.

Several Vick's® products can be used during the mixing process. The Vick's Vaporizer® can be plugged in to emit the smell into the air. The Vick's VapoSteam® liquid can be diluted with water in a spray bottle to spray around the enclosure and on the mongoose. Vick's VapoPads® can also be used to make a spray solution by soaking the pads in a spray bottle of water. The Vick's VapoRub® itself can be used to smear around the enclosure and on the mongoose.

If it is possible to schedule the mixing day so that it coincides with any routine vet procedures, the Vick's VapoRub® can be applied directly to the mongooses body and nose. Otherwise, you can smear the insides of a catchbox with Vick's VapoRub® and catch each mongoose up individually. If your catchbox has a hole in the door for an induction tube, then when the mongoose sticks its nose out the hole you can smear a little Vick's VapoRub® on their nose. After you release them from the catchbox then you can also spray them down with the Vick's VapoRub® spray solution.

After the enclosure has been disinfected you can smear Vick's VapoRub® on all surfaces in the enclosure. Then you can spray everything down with the spray solution.

Once the enclosure and the mongoose are covered in Vick's® you can then begin mixing one mongoose at a time, starting with the least dominant mongoose if possible. The mongoose should immediately start rolling around, smelling and scent marking on each other. If any fighting does occur you can spray them with the Vick's VapoRub® spray solution to break it up. If any fights are severe enough that the keeper needs to physically separate the mongoose, lock them in separate pens until they calm down and repeat the process. A spray bottle of the Vick's VapoRub® solution is great to keep on hand to break up and stop any fights that may occur on a daily basis.

After the mixing process is complete all the mongoose should be coexisting peacefully.

American Association of Zoo Keepers' Leadership

AAZK's structure is made up of a five member volunteer Board, a CEO/CFO, an Editor and Assistant Editor for the Animal Keepers' Forum. It is the function of the AAZK Board of Directors to serve as governing body of the Association, making and implementing policy designed to carry out the goals and purposes of AAZK.

President Board Member

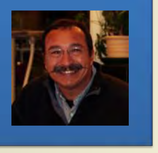
Organizes and directs committees and programs through oversights, to represent and advance the Association's Mission and Vision statements.

The American Association of Zoo Keepers exists to advance excellence in the animal keeping profession, foster effective communication beneficial to animal care, support deserving conservation projects, and promote the preservation of our natural resources and animal life.

AAZK will be the leader in the zoo and aquarium industry fostering professional development and personal connections that advance animal care, animal welfare and conservation.

Oversight for:

- Association Mission
- External and Internal Communications
- Mentor Board, Committee Chairs and Chapter Presidents
- Liaison with Professional Associations



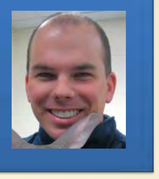
Bob Cisneros

Recognition Board Member

Recognizes and encourages excellence in the field of animal care through committees, programs and Membership involvement:

Oversight for:

- Awards
- Grants
- National Zoo Keeper Week
- Chapter of The Year



Kelly Wilson

Communication Board Member

Facilitates communication through Social Media resources and provides internal communication strategies to assist the Board of Directors, membership and Chapters in facilitating communication.

Oversight For:

- Website
- Social Media
- Board and Committee Meeting Scheduling

Deana Walz

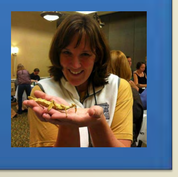
Conservation Board Member

Connects AAZK members with opportunities to engage in habitat conservation and in situ wildlife initiatives and to provide educational resource about environmentally responsible practices.

Engages keepers and the public in raising funds, which go directly to in situ conservation projects, conserving four species of rhino, their habitats, and hundreds of other endangered plants and animals.

Oversight For:

- Conservation Committee
- Bowling for Rhinos (BFR)



Wendy Lenhart

Education Board Member

Provides resources for National AAZK Members to explore continuing education opportunities and encourages the sharing of behavioral husbandry knowledge and techniques.

Oversight for:

PDC

- Conference Program
- Professional Development Workshops
- Online Learning
- Certification

BHC

- Traditional Workshops
- AKF Columns
- Current Trends

Penny Jolly

CEO/CFO

Handles all legal, membership and general correspondence, communicating with the AAZK Board where input and ratification of policy is required.

Responsibilities include:

- Finances
- Membership
- Conferences
- Products
- Job Postings
- AKF Editors Supervisor
- Operations Manual Revisions
- Bylaws
- Ethics
- Institutional Partnerships

Ed Hansen

To Contact Your AAZK Board or Staff, please email: info@aazk.org

Media Production Editor and Assistant Editor for the *Animal Keepers' Forum* (AKF)

The AKF contains articles on behavioral husbandry, professional development, and conservation from submissions by AAZK Members. Each issue also has regular columns and listings of upcoming conferences and symposia and Association news.

Responsibilities Include:

- Production and printing of the *Animal Keepers' Forum*
- Solicit s advertisers , sponsors and Commercial members
- Recruits article submissions and cover photos

Shane Good

Elizabeth Thibodeaux

Penny Jolly
Disney's Animal Kingdom

Phylogenetic Identification of Octopod Species Diversity in Antarctic Waters

Rachel S. Twigg, Kevin M. Kocot, Pamela M. Brannock, Kenneth M. Halanych
Department of Biological Sciences, Auburn University, Auburn, AL 36849
Email: rst0004@auburn.edu, ken@auburn.edu

Abstract

Antarctica hosts a diversity of octopus species, but there are significant gaps in our knowledge of just how many there are and where they occur. Using samples recently obtained on an *R/V Palmer* cruise to the Amundsen, Bellingshausen, and Ross Seas (Figure 1), we have been characterizing diversity through a combination of morphology and molecular tools. For the molecular aspect of this work we are using the CO1 mitochondrial gene for barcoding. Amplifications were sequenced and aligned, then compared to known species from the NCBI database. Unknown specimens were compiled into a phylogenetic tree with the known taxa in order to more easily visualize diversity of the group. A *Grimpoteuthis* sample was utilized as an outgroup. The majority of individuals were either *Adelieledone polymorpha*, *Parledone aequipapillae*, or *Parledone turqueti*. Continued analysis will be performed on samples recently gathered from the Weddell Sea and Antarctic Peninsula and added to the current data. This will expand the knowledge of which species are present in these regions. It will also contribute to a preliminary understanding of octopus species diversity in Antarctic waters, providing a reference point for future conservation efforts. Support for this research was provided by the NSF Office of Polar Programs, as well as the Auburn University Fund For Excellence Undergraduate Research Award.

Results & Discussion

1) Phylogenetic analysis shows the majority of specimens were *P. aequipapillae, P. turqueti,* and A. *polymorpha.*
2) Single specimens at two other *Pareledone* species were also recovered.
3) Correlation between *P. turquti* and collection location was not observed. *A. polymorpha and P. aequipapillae* both were predominantly found in the Wrights Gulf and Ross Sea.
4) The lack of genetic structure observed here is similar to the findings of Allcock et al. (1997).
5) Sampling from the Weddell Sea and Antarctic Peninsula will be added to the current project and results will be compared to patterns seen in other animals.

Table 1: The number of specimens of each genus and their respective collection location.

Genus	Location	Specimen
Pareledone		
	Amundsen Sea	9
	Bellingshausen Sea	7
	Ross Sea	11
	Wrights Gulf	11
Adelieledone		
	Amundsen Sea	1
	Bellingshausen Sea	2
	Ross Sea	7
	Wrights Gulf	10

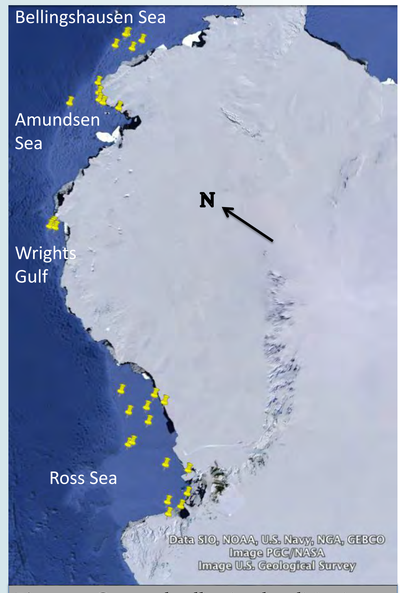


Figure 1: Octopod collection localities in Antarctic areas of Wrights Gulf, Bellingshausen, Amundsen, and Ross Seas.

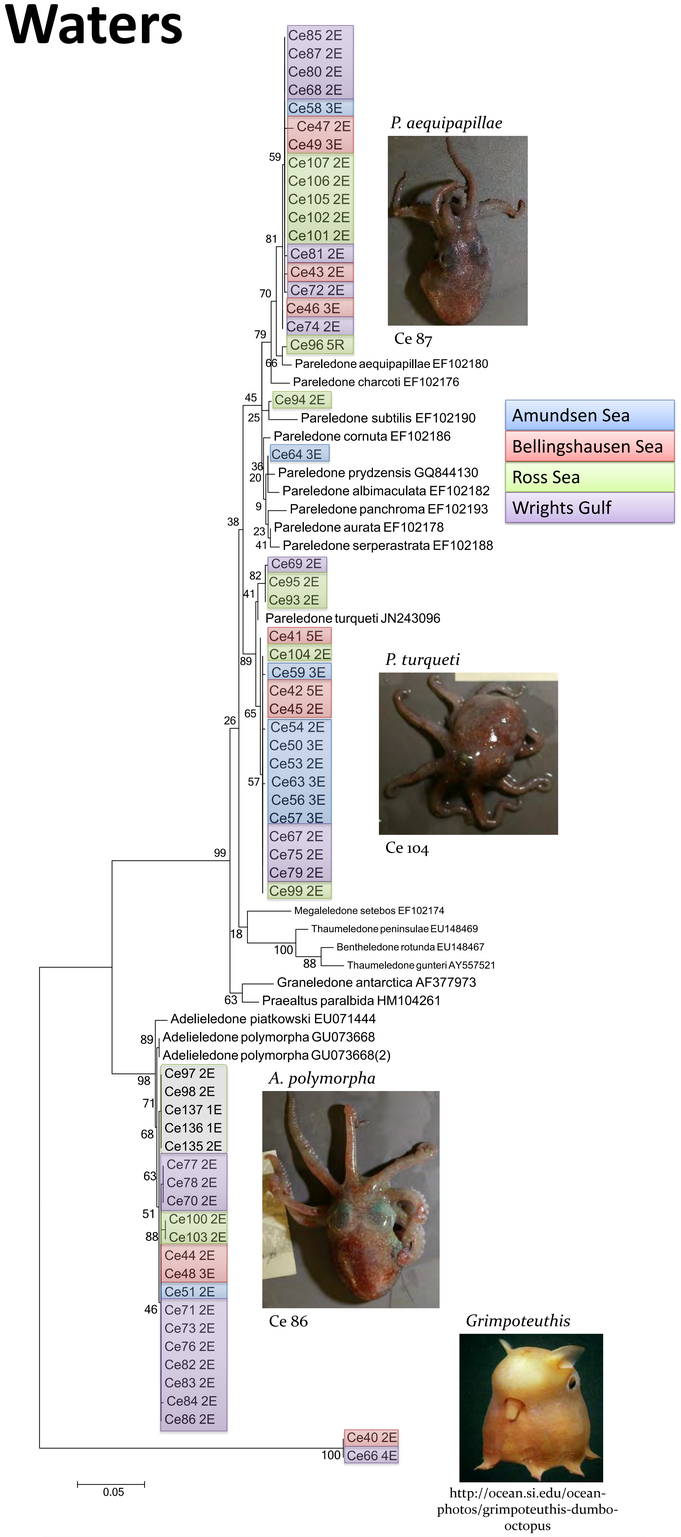


Figure 2: A maximum parsimony tree of octopod samples collected during the January-February 2013 "Icy Inverts" Antarctic Research Expedition on the *R/V Palmer*. Specimens collected on this cruise are denoted with 'Ce' and a sample number, and all other sequences were downloaded from the NCBI database GenBank.

Methods

1) Sample information for each species is provided in Table 1 and Figure 1.
2) After preliminary morphological identification, DNA was extracted.
3) The mitochondrial COI gene (Figure 2) was amplified using primers adapted from Undheim et al. (2010).
4) Purified PCR products were sent to GENEWIZ for sequencing.
5) Nucleotide data were aligned with publicly available sequences, and phylogenetic analysis was performed in MEGA 5.0 (REF) using *Grimpoteuthis* as outgroup.

Acknowledgments

1) NSF Office of Polar Programs – ANT-1043745, OPP- 0338218
2) Auburn University Fund For Excellence Undergraduate Research Award.
3) Assistance from members of the Molette Lab and the *R/V Palmer* is gratefully acknowledged.

Citations

Allcock, A. L., et al. Resitricted gene flow and evolutionary divergence between geographically separated populations of the Antarctic octopus *Pareledone turqueti*. *Mar. Biol.* **129**, 97-102 (1997).

Undheim, Eivind, et al. Genetic identification of Southern Ocean octopod samples using mtCO1. *C. R. Biologies* **333,** 395-404 (2010).

Making a World of Difference in River Otter Coat Quality

Robin F. Chambers
Pittsburgh Zoo and PPG Aquarium

Abstract
It came to our attention in 2012 that our two North American River Otter's coats were becoming highly matted and their grooming behavior frequency had declined. After an addition of Fish Oil to their diet had not changed the quality of their coats we made it our mission to figure out what we could change in their exhibit to encourage an increase in grooming behavior and overall coat quality. We found that several things needed to be changed in the exhibit and in their daily care. First we increased our exhibit cleaning frequency. Then we changed out artificial man made dens for natural material dens. Next, we increased the number of dens and varied the amount of open exposure of the dens. Lastly, we introduced new enrichment items that would encourage grooming. The result was a drastic decrease in the matting of their coats and an increase in grooming behavior frequency.

Introduction
Coat condition is extremely important to health and quality of life of a River Otter. River Otters have a very dense under coat which is over laid with longer guard hairs. The guard hairs provide a water proof layer that help keep the otters under coat dry while swimming. Damage to to an otters coat could lead to problems with thermoregulation, skin issues, and exposure to disease and trauma such as abrasions.

Methods
With the help of my colleagues we decided that modifications to the otters exhibit and our cleaning methods needed to be made, and the following changes were made:

- Plastic and other man made dens were replaced with natural wood dens of varying sizes.
- Exhibit Cleanings were increased from an as needed basis to every day feces removal and twice a week bedding changes.
- New enrichment items that encourage grooming activity were added, such as sisal rope rapped logs, sisal mats, and logs with thick bark.

Results
The River Otters really took to the changes that were made. They started rubbing on the new enrichment items right away and moved right into their new dens. We saw a large increase in the amount of time spent grooming as well as an increase in pair grooming. We also noticed that with an increase in the frequency of cleaning of their exhibit, the otters started using one particular area as their latrine. Previously they would defecate anywhere in the exhibit. The real test was when it came time to shed. In previous years their coats would mat and not shed out, resulting in having to be sedated and groomed by the veterinary staff. With the changes we made, the otters did still mat but the matting was not as severe and was quicker to be shedded off. They have also shown an increase in time spent swimming and are starting to show seasonal changes in the dens they choose, which we are hoping may lead to an increase in successful breeding and pup rearing.

Conclusions
The changes that were made in dens, cleaning, and enrichment, have made a world of difference to not only the coat quality of our otters but their over all quality of life. The increase in grooming activity and the resulting quicker shedding of mats has lead to an increase in their swimming and general activity level. It has also lead to the otters using one area as their latrine which makes cleaning easier and the over all sanitary conditions of the exhibit better. The otters have also shown an increase in the amount of time they spend denned up together which we are hoping will lead to a successful breeding season this year. We are still researching additional methods to make their coat quality even better, and are eager to make the River Otters quality of life as good as it could possibly be.

Acknowledgments
The Pittsburgh Zoo and PPG Aquarium
Henry Kacpryzk
Joe Wozniak
Mike O'neal
Kesha Phares
Judy Obeldoble

Inspiring Conservation Action in Oakland Zoo Visitors Through Direct Involvement

Shana Jensen, Floating Keeper, Oakland Zoo

Introduction

In Oakland Zoo believes that each person has the power to become stewards of the natural world and decrease global footprints while inspiring others to do the same. Conservation work within zoos has a better chance of success with involvement of surrounding communities. At Oakland Zoo, conservation is very important. The zoo is actively involved with local universities and organizations and is dedicated to conservation projects all around the world. With the help of members and sponsors, the zoo is able to address a wide range of conservation issues both globally and closer to home. At the Oakland Zoo, visitors can become involved by attending conservation lectures and educational presentations both on site and off involving information and animal ambassadors (e.g. western pond turtle). Through our Quarters for Conservation program, Oakland Zoo visitors can vote for their favorite conservation projects. Webcams set up at our on-site and off-site conservation work with California Condors and Mountain Yellow Legged Frogs allow visitors to check up on some of their favorite projects anytime. Efforts such as these keep the Oakland Zoo true to our mission of “inspiring respect for and stewardship of the natural world.”

Current Programs

Oakland Zoo invites the public to become good stewards of the planet and to understand core ideas of conservation through various initiatives, such as:

- Immersing children and teens in science programs both at the Zoo and in the field
- Conducting hands-on research and a living laboratory focused on California Condors
- Celebrating Earth Day and building effective partnerships with conservation groups
- Raising wildlife conservation awareness through ZooMobile and docent stations

By engaging outside groups of individuals (e.g. student groups, service organizations) Oakland Zoo is successful with habitat enhancement and conservation by:

- Restoring local creek watersheds
- Removing non-native plant species
- Seeding and planting native species of plants

Western Pond Turtles

Western Pond Turtle Hatchling

Having a resident Western Pond Turtle allows visitors at the zoo to get an up-close look at an ambassador for the head start program the zoo is involved in

Presenting information about our Western Pond Turtle work at local events is a great way to inform the public about the conservation work that is done at the zoo and off site

Workers and volunteers get to be involved in the release of the turtles every year

California Condors

Not only does Oakland Zoo rehab California Condors but the public is able to view them from home through a webcam!

Employees at Oakland Zoo made a documentary surrounding California Condors and the work that is being done at the zoo to help them for the public to view

Collaborating with the condor program at the Los Angeles Zoo, Oakland Zoo has developed and helped improve how California Condors are cared for and treated for lead poisoning

Check out what the Condors at Oakland Zoo are up to right now! →

ACKNOWLEDGEMENTS

I would like to thank Oakland Zoo’s Education and Conservation teams for their hard work in developing these connections between the public and conservation awareness

Quarters for Conservation

Annually keepers and volunteers present conservation projects they would like to be considered for Quarters for Conservation. Once the zoo’s staff and volunteers have voted, the top 3 candidates are chosen. Visitors are given a token to represent the $0.25 taken from their admission fee and they then choose which of the 3 programs they would like it to go towards

What’s Next?

OAKLAND ZOO conservation speakers SERIES

Regional and international speakers host talks about conservation actions they are involved in. The series is open to the public, volunteers and employees of the zoo. This forum offers keepers an opportunity to talk about conservation programs they are involved in.

Partnering with other zoos and field researchers, head start programs for the Puerto Rican Crested Toad and Mountain Yellow Legged Frog have begun at the Oakland Zoo. The brand new Biodiversity Center at the zoo provides an opportunity for local schools to learn about reintroduction programs and see firsthand our efforts in captive breeding of critically endangered amphibians.

A drawing of a proposed grizzly exhibit for the California Trail expansion

The upcoming California Trail expansion will protect regional fauna along with creating exhibits that highlight conservation efforts for endangered native species.

Check out a virtual tour of the future California expansion at Oakland Zoo! →

Conclusion

Without partnership of local residents and zoos *in situ* conservation programs will not have long term success. By involving the public zoos and educators are able to bring about cultural awareness that can be the underlying support for successful conservation efforts.

Development and Implementation of a Jaguar Artificial Insemination Program Using Operant Conditioning

Sheryl Staaden
Jacksonville Zoo and Gardens

Introduction

Behavioral issues with a genetically valuable male jaguar prevented natural breeding at the Jacksonville Zoo. The response was to establish an artificial insemination (AI) program to develop techniques to inseminate transvaginally without chemical immobilization, using operant conditioning and a squeeze cage. This method of AI was an alternative to the traditional surgical approach and was previously untried.

Figure 1: Natural breeding attempt.

Materials and Methods

- Desensitization and training of a female jaguar for acceptance of manipulation using a squeeze cage.
- Development of insemination techniques through experimentation.
- Determination of ovulation and insemination timing through analysis of estrus behaviors, digital vaginal palpation, and fecal hormone analysis.
- Electro-ejaculation of the male for semen collection.
- Insemination by insertion of a 10 French 56 cm catheter 10 cm into the vagina to the cervix and injecting via syringe.

Figure 2: Keeper working with female jaguar in squeeze cage during an AI training session.

Figure 3: Electro-ejaculation of male jaguar.

Results

- Demonstrated the importance of keepers utilizing training techniques.
- Determined for the first time that jaguar females undergo spontaneous ovulation if not bred.
- Detailed characterization of estrus through analysis of cycling behaviors.
- Developed a method of verifying cycling through digital vaginal palpation.
- Identified hormone profiles through fecal hormone analysis.

Conclusions

The successfulness of this transvaginal non-surgical approach has yet to be determined, as it was later discovered that the female used in the procedures was non-reproductive. Further attempts will need to be made with a reproductively viable female. The insight gained from the conditioning process and the development of AI techniques will be useful information for captive breeding programs for jaguars, and potentially for other non-domestic felid breeding programs.

Reproductive Observations thru Training
2009 "Xena" # 806300

Date	Estrus Behaviors?	Vulva appearance - swelling/pink?	Vaginal Discharge?	Digital palpation performed?	Vulva tight?	Depth catheter inserted (cm)	Discharge observed in catheter?
8-Apr	no						
9-Apr	no						
10-Apr	no	no	no	yes	no	10	no
11-Apr	no	no	no	yes	slightly	7.5	?
12-Apr	no						
13-Apr	no	no	no?	yes	yes		n/a
14-Apr	no	no	no	yes	yes	7.5	no
15-Apr	yes						
16-Apr	yes						
17-Apr	yes	no	no	yes	yes	7.5	no
18-Apr	yes	yes	yes	yes	yes	no	n/a
19-Apr	yes	yes	?	yes	yes	7.5	no
20-Apr	yes	yes	no	yes	yes	7.5	no
21-Apr	yes	yes	no	yes	yes	7.5	no
22-Apr	yes						
23-Apr	yes						
24-Apr	?						
25-Apr	no						
26-Apr	no						

Figure 4: Chart analyzing estrus behaviors in conjunction with digital vaginal palpation.

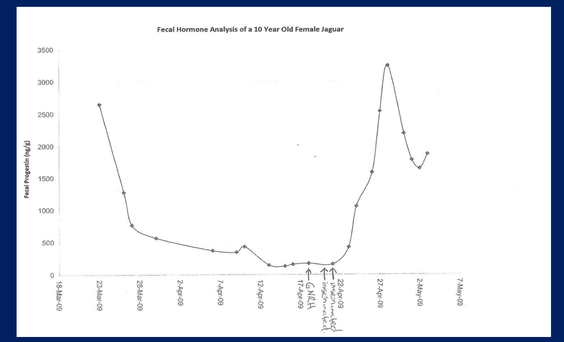


Figure 5: Fecal hormone analysis indicating progesterone levels and inseminations.

Figure 6: Inserting finger for vaginal palpation.

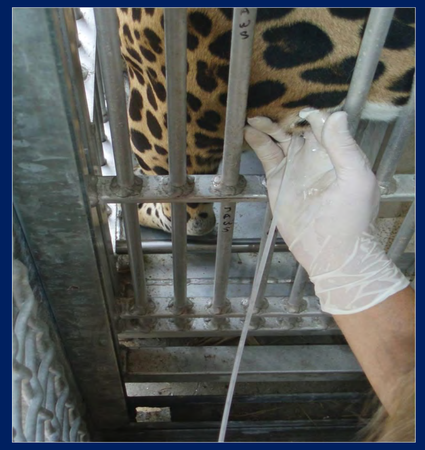


Figure 7: Inserting catheter into vagina.

Figure 8: Injection of semen via syringe.

Acknowledgements
Thanks to Dr. Linda Penfold and Dr. Lara Metrione from SEZARC (South-East Zoo Alliance for Reproduction and Conservation), Dr. Nikolay Kapustin and Craig Miller from Jacksonville Zoo and Gardens and J. Andrew Teare, DVM for their collaboration and input on this project.

Tricks of the Trade

We've all got 'em, why not share 'em!

Stephanie Earhart
Hospital Keeper
Zoo Atlanta, Atlanta, GA


Footbath Insert

Freezer Organization


Venomous Snake Squeeze Box


Live Bug Feeder


Gecko Spoon


Meshy Repair Patch


Venomous Snake Waterer


Bird Catch Kennel


Variable Bird Perch


Kennel Door Conversion


Hoofstock Fecal Scoop


Mesh Bowl Holder

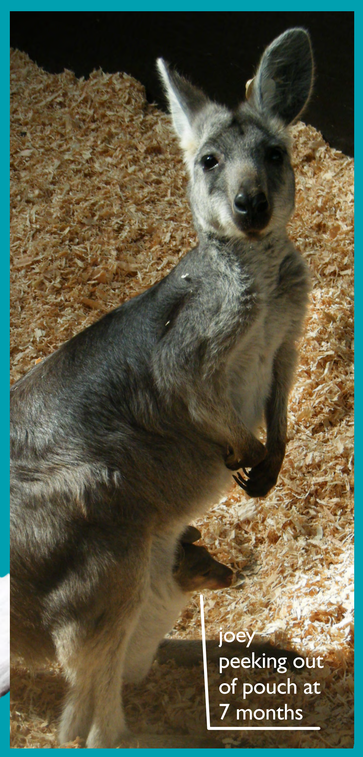

Bird Nets

WALLAROO JOEY DEVELOPMENT

Wendy Gardner *Woodland Park Zoo, Australasia Zoo Keeper*
Allison Barr *Woodland Park Zoo, Zoo Keeper*

ABSTRACT

Working with a very tractable wallaroo female has many advantages. One of those is being able to perform regular pouch checks. This became a very valuable technique when our female lost her first joey very unexpectedly at 7 months.



The pouch checks allowed staff to view what appeared to be normal nipples and mammary development as well as being able to express milk and to check for visible abnormalities or anything that might have required medical attention. Within approximately 3.5 weeks after her losing her first joey, a pouch check revealed a new, approximately 2-day old joey attached to a nipple in the pouch. Since our female wallaroo allows us to perform regular pouch checks, we thought it would be a unique opportunity to document the different milestones the joey goes through as it develops in the pouch, and share the information through the SSP. Developmental milestones are recorded both with written and photographic documentation. We began by adopting the developmental milestones that have been used in other macropods, such as the first appearance of nails, opening of eyes, fur starting to come in, etc. Pouch checks are always performed voluntarily without restraint. If the female shows aversion to the session (e.g., by moving away), then we attempt the pouch check at a later time. As a macropod keeper, observing all of the developmental changes that occur over even a week's time has been a valuable learning and documentation tool.

DAY 12

Little development in joey, pale coloration

DAY 21

Joey more pink in color and nail coloration visible

DAY 29

DAY 36

DAY 55

Joey has doubled in size, small nails, ears are flap-like, back legs defined

DAY 63

Eye is less blue and is larger. Joey looks moist and the pouch feels humid.

DAY 78

Temperature of upper pouch is 85°

DAY 140

Joey is much larger. Back feet are large, nails grown in. Eyes start opening, coloration begins on nose and hands.

DAY 154

DAY 161

Legs are very long and fill a lot of the pouch. Darker fur is covering front of the legs and thighs.

DAY 168

The joey is looking more like a little wallaroo. Fine gray fur is covering most of the head and legs. The tail is still naked at this point.

Purpose

To serve our AAZK members by providing access to up to date resources relevant to Behavioral Husbandry topics including: training, enrichment and animal welfare. The committee strives to encourage, educate, share knowledge and share techniques typified in zoo and aquarium settings.

WELFARE
Behavioral
HUSBANDRY
COMMITTEE
ENRICHMENT • TRAINING

Members

Penny Jolly (Board Oversight)
Julie Hartell-DeNardo (Committee Chair)
Kim Kezer
Jonathan Miot
Jay Pratte
Vernon Presley
Amanda Ista
Casey Plummer
Megan Wright
Pattie Beaven

Committee Advisors
Dawn Neptune
Beth Stark-Posta

Resources

- Animal Data Transfer Form
- Glossary of Training Terminology
- Enrichment Guidelines for Nine Taxa
- Training & Enrichment Bibliography
- Enrichment Day Resources
- Links for Enrichment & Training Supplies
- BH Safety & Risk Assessment Materials
- BH Health & Safety Consideration Materials

Activities

- Facebook Page
- Editors of Enrichment Options & Training Tales Columns in AKF
- Present Behavioral Husbandry Workshops Yearly at Conference
- Create Webinars for Collabornation Site

The Zoo That Never Sleeps

Thomas Dillenbeck and Kimberly Mott
Disney's Animal Kingdom® and Disney's Animal Kingdom Lodge®

At Disney's Animal Kingdom® and Disney's Animal Kingdom Lodge® there is a committed team that provides seamless 24-hour animal care coverage, enhancing all aspects of animal care and welfare. Night keepers perform many of the same tasks as their daytime colleagues, in addition to responsibilities unique to the overnight shift. Having a large team allows some keepers to handle the day-to-day tasks, freeing others to provide specialized animal care when needed.

The Night Shift

- The normal night shift starts at 1800 and ends at 0500 the next morning – the workweek consists of four 10-hour nights.
- The Night Team includes 18 full-time keepers and 4 managers.

Feeding

- Keepers feed waterfowl and hippos at the Park.
- Keepers at the Lodge provide grain, browse, and hay to the animals on the savannahs.
- Calves being hand-reared are bottle fed.


Off exhibit area

Enrichment

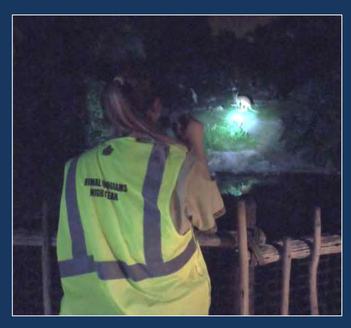
- Many animals are very active at night and benefit greatly from enrichment during this time.


Off exhibit area


Off exhibit area

Animal Checks

- The team checks animals as part of routine rounds.
- The team is often asked to check on animals for medical reasons and contact the on-duty vet if necessary.
- Pregnant animals are monitored closely in their parturition window.

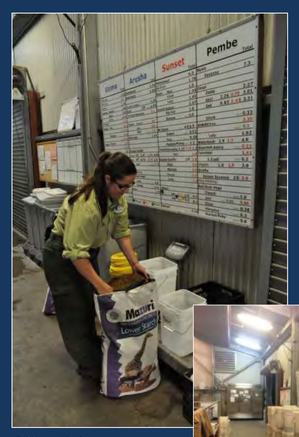


The Night Safari

- The Night Safari is an hour-long guest experience aboard an open-air safari vehicle, with night vision scopes.
- Night keepers are the guides and drivers, sharing facts and stories about the animals and their routine after dark.
- The Night Safari is offered to guests staying at Disney's Animal Kingdom Lodge®.

Diet Preparation

- The keepers at Disney's Animal Kingdom Lodge® prepare diets to be used the following day.
- Diet preparation involves cutting fresh produce and weighing grain for hoofstock.



Off exhibit area


Off exhibit area


Off exhibit area

Animal Welfare

- A lot of maintenance and construction work takes place overnight.
- The Night Team monitors the impact of this work on the animal collection and can cancel or alter work if necessary.

Shifting

- The Night Team assists the day teams with bringing animals in and closing their areas at the end of the day.
- Some animals at the Lodge, such as giraffe and Red River hogs, are shifted in at night.


Off exhibit area


Off exhibit area

Research

- Research projects night keepers assist with include endocrine studies of giraffe, lion, and zebra, and a giraffe grazing study.


Off exhibit area

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