

Proposal to evaluate and address pacing in Santa Barbara Zoo's fennec foxes

Cynthia E. Stringfield, D.V.M.

October 9, 2017

Background:

Problem: Security guards reported observing pacing by the fennec foxes throughout the night when they were observing the lion. Per one of their keepers (Kristen Wieners): She sees nose prints on the glass consistent with pacing and "the pacing is typically Andy and Bill on the windowsill and Jasmin down in the sand on the left hand side of the exhibit when you are looking from the front. It occurs typically in the AM after or before cleaning around 9 or so, but I have seen it in the afternoon as well." Kristen also reported that one day "there was tree trimming happening very close to their exhibit and the boys were fine but Jasmin was super stressed and went from pacing on the ground to up on the window ledge." Regarding stopping the pacing, Kristen reports "There have been a few attempts to stop the pacing since I have been here. Most of them are blocking the path with small logs on the windowsill. If I happen to see it I can usually open the door and go in and the foxes will stop and settle and usually stay settled."

Natural History: Fennec foxes are nocturnal and live in monogamous pairs and are highly social, they live with their offspring in groups up to 10 in number. They are territorial and dig burrows. They hunt at night, singly, with a "stalk-spring-pounce" method. They are omnivores, often digging for food, and historically have been reported to eat small animals, eggs, fruit, leaves and roots, however, in 2011 the first wild study done on diet in reported the highest percentage of the diet was insects, and that animals were eating more vegetation (especially dates) than previously thought (Brahmi).

SBZ fennec foxes: 2.1, Two male offspring 5 years old and their mother who is 6 years old. Both offspring are under treatment for medical problems, one for a bladder stone and one for inflammatory bowel disease.

Stereotypies, pacing in carnivores and fennec foxes: Stereotypic behavior has been defined as a repetitive, invariant behavior pattern with no obvious goal or function (Odberg, Mason). It is often suggested to indicate welfare problems (Appleby, among many other publications). Locomotion-related stereotypies have been evaluated in many species of carnivores (Clubb, Mason). Fennec foxes specifically have been reported to have stereotypic behavior commonly, and it was evaluated and reported on by Kathy Carlstead in 1991. This article drew the conclusion that stereotypic running was elicited by many different kinds of social and environmental factors that evoked a

flight response. She recommended providing large, flat outdoor exhibits with secure hiding places for fennec foxes, however this recommendation was arrived at without utilizing systematic behavioral observations. Enrichment has been detailed as the main husbandry tool to tackle stereotypies in zoo animals (Swaisgood), and more recently, in 2011, Watters in an article out of the Brookfield Zoo reported using optimal foraging theory to create a foraging strategy that stimulated increased behavioral diversity, activity and guest interest in zoo housed fennec foxes.

Behavior analysis: Behavior analysis is a scientifically validated approach to understanding behavior and how it is affected by the environment. Applied behavior analysis utilizes analysis of a specific behavior of an individual through a process called a functional assessment. Historically, stereotypies have been defined as “functionless”, however, current research into autism in humans and repetitive behaviors in animals have created discussion about repetitive behaviors having a function for the animal, though it may be difficult to ascertain what that function is.

Goal:

The goal is to improve welfare by evaluating the pacing and changing the environment of the SBZ fennec foxes to decrease pacing and increase other natural activities. Behavioral observation and a functional assessment will be performed. Once the behavior is evaluated, interventions will be designed and evaluated using all current literature – changes will likely involve feeding strategies, exercise, digging, and hiding options.

Project:

SBZ will provide and install a bullet camera with infrared to be able to observe the foxes; Michele Green and fennec fox keepers will pursue this with zoo staff. Cynthia Stringfield will observe the behavior initially for 5-7 days via the zoo’s online program (initial time depends on the consistency of the behavior), it will be then evaluated by Cynthia Stringfield, Katherine Gould (M.S. in Biology), Dr. Susan Friedman (www.behaviorworks.org), Julie Barnes, and Estelle Sandhaus. SBZ animal care staff will supply and administer all husbandry changes while the previously mentioned group will continue to do the behavioral evaluation of response to changes. This case study will be written up in a scientific journal and include the collaboration (as co-authors) of Julie Barnes and Estelle Sandhaus. This study will be undertaken at no charge to the SBZ.

SBZ IT has confirmed it can give Cynthia Stringfield access to the online video only from the fennec fox camera via her laptop. SBZ has the bullet camera and access to connect it is close since the exhibit is next to the lion exhibit.

Identifying the three foxes will need to be done once the bullet camera is installed and images evaluated. It is likely that shaving a part of the tail on two foxes will need to be done for ID purposes. This can be done quickly with manual restraint, or during an otherwise scheduled medical procedure (two of the foxes are undergoing treatment for medical problems).

For any questions or concerns, please don't hesitate to contact Dr. Cynthia Stringfield at (818) 469-7829 or cstringfield@sbcglobal.net.

Sabbatical Summary

Cynthia E. Stringfield, D.V.M.

Purpose:

My sabbatical had 2 main goals:

- 1.) **Pursue Board Certification in Animal Welfare:** I will be able to act as a resource for and share information with ANSC/EATM faculty and Moorpark college faculty (and VCCCD faculty if the district so desires), and staff of America's Teaching Zoo.

I pursued this goal in conjunction with Jose M Peralta, DVM, MSc, PhD, Associate Professor, Animal Welfare & Veterinary Ethics at Western University School of Veterinary Medicine. I applied to begin the process and went to visit Dr. Peralta to discuss my plan, which included needing to write several original publications.

I then worked with Susan Friedman, Zoo Behavior Analyst, to begin work on a welfare project for publication with the Fennec Foxes at the Santa Barbara Zoo (see SBZ Proposal to their Animal Welfare Committee). Susan recommended I read three books, *Measuring Behavior* by Martin and Bateson, *Observing Animal Behavior* by Dawkins, and *The Science of Consequences* by Schneider, so I read these books in addition to observing the Fennec Foxes and offering solutions to their pacing problem.

- 2.) **Attend Third International Zoo Animal Welfare Symposium** in Chicago, and visit with experts at the **Chicago Zoological Society Center for the Science of Animal Care and Welfare** in October of 2017.

Due to financial constraints (sabbatical recipients are not able to receive C.E. conference funding), I was not able to attend this conference and instead went to the AZA Conference and attended the excellent broad array of welfare talks there (<https://annual.aza.org/2017/indy.cfm>).

Unfortunately, due to the fires in So. Cal in December, ATZ had to be evacuated so I took part in ensuring the care of the animals that were housed temporarily at a hangar at Oxnard airport. After these animals were brought back to Moorpark, Santa Barbara Zoo had to evacuate and so I helped care for animals there during that fire. Because of this disruption, the Fennec fox paper had to be put on hold due to a problem installing an additional camera and medical problems two of the foxes had.

I have utilized what I learned during my sabbatical to help with behavior problems at ATZ, including pacing by the hyena. I relayed my experiences to students in a formal power point presentation upon my return, and taught them about this board certification and what is currently happening regarding welfare programs in AZA accredited zoos, a new accreditation requirement (this is why I chose to attend the AZA conference, I had wanted to go to both but was unable to). I have continued to offer my expertise to ATZ staff and EATM faculty in the area of animal welfare. I also created a powerpoint with pictures for welfare assessment discussion in my EATM Animal Health and Safety class when Zoo Emergencies are covered.