TECHNOLOGY USE FOR PHYSIOLOGICAL STATE: USE OF NIRS TO PREDICT PREGNANCY STATUS IN BONGO (*TRAGELAPHUS EURYCERUS)*

Kathleen Sullivan, PhD[1], Shana R. Lavin, PhD[1], Kelsey Hall, BS[1]*, Avnee Mistry, [1]*, Scott Williams, MS[1], Shannon Livingston, MSc[1], Catharine J. Wheaton, PhD[1], and Eduardo V. Valdes, PhD[1,2,3,4]

[1]Department of Animal Health, Disney's Animals, Science, and Environment. 1180 N. Savannah Circle, Bay Lake FL 32830, USA.
[2]Department of Animal Sciences, PO Box 110910, University of Florida, Gainesville, FL 32611, USA.
[3] University of Guelph, 50 Stone Road East Guelph, Ontario, N1G 2W1, Canada.
***[4] University of Central Florida**, **4000 Central Florida Blvd. Orlando, FL 32816**, USA.*

Abstract

The eastern bongo (*Tragelaphus eurycerus*), a browsing African antelope species, is critically endangered. Diets under human care can be challenging for this species because of limited browse availability, and maintaining optimal health for reproduction is critical. Monitoring reproductive status in the bongo using fecal hormone analysis has not yet been explored; thus, we developed the methods for and validated a fecal hormone assay for detection of pregnancy in this species. As many institutions do not have an endocrinology laboratory nor a resident endocrinologist, utilizing near infrared spectroscopy (NIRS) would be a practical tool for detecting pregnancy. This technique also does not require the use of hazardous chemicals and has been applied to other species with varying success (e.g., Tolleson et al., 2001; Wiedower et al. 2012). Our objective was to develop an NIRS calibration to predict an estrogen metabolite (E1C) identified as a marker of pregnancy in dried bongo fecal samples. All animals sampled were on similar diets (Table 1). A total of 119 oven-dried fecal samples were used from 0.3 bongos to create the calibration, including two pregnancies in 0.1 bongo in the sample set (SEC = 1.04; R^2 = 0.84; cross-validation: SECV = 1.7; R^2 = 0.55). A total of 50 samples (25 pregnant and 25 non-pregnant) not included in the original calibration were used to further assess the accuracy of the prediction with moderate success. Utilizing this calibration, NIRS may be used to detect pregnancy in bongos, which has important consequences on maternal nutritional formulations and hand-rearing protocols for this species.

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Literature Cited

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Wiedower E.E., Kouba A.J., Vance C.K., Hansen R.L., Stuth J.W., Tolleson D.R. (2012) Fecal Near Infrared Spectroscopy to Discriminate Physiological Status in Giant Pandas. PLoS ONE 7(6): e38908.

Table 1. Average Daily Diet of a female Bongo at Disney's Animal Kingdom

Food Item	**Average Grams / Day**
Bermuda Grass Hay	1000
Timothy Hay	500
Mazuri Wild Herbivore Plus 5Z8W	4800
Mazuri Zu-Life Wild Herbivore 5Z0X	1600
Ear Leaf Acacia	2000
Banana Leaf	500
Acacia Longfolia	1000
Romaine	582
Sweet Potato	107
Beet Pulp	100
Carrot	100
Apple	63
Supplemental Produce Enrichment*	50

*Includes green leaf lettuce, green beans, celery, turnip, bok choy, yellow squash, endive, and zucchini