

Reproduction in the southern tamandua (*Tamandua tetradactyla*): behavior to birth

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Introduction

The Southern tamandua (*Tamandua tetradactyla*), also known as the lesser anteater, is an insectivorous and arboreal mammal native to Central and South America. It uses its inordinate strength to rip open ant hills and termite mounds and its 12in tongue to consume roughly 9,000 ants/termites per day. Tamanduas are currently listed as Least Concern on the IUCN Red List of Threatened Species. Literature regarding tamandua behavior and physiology is severely lacking; much of the information regarding reproductive biology in this species is anecdotal. Gestation length is reported to be 130-190 days and females typically produce one pup at a time. Pups stay with dams for approximately 1 year and experience the world from their perch on their dam's back.



Currently there are 1.1.1 tamanduas at CZBG. Isla— a 6 year old female, her mate Salvador— a 5 year old male, and their 0.0.1 offspring (born 16 Feb 2020). The pair is recommended for breeding by the tamandua SSP, and have produced two viable offspring. Because there was so little information available regarding this species, the goals of this project were to: 1) monitor daily behavioral and physiological changes associated with reproduction 2) use this information to accurately time estrous cycle and receptivity 3) determine if tracking fetal development through trans-abdominal ultrasonography could be used to estimate date of parturition, and 4) use collected data to inform breeding, pre-natal, and post-natal management practices.

Materials and Methods

- Behavioral and physiological changes associated with reproductive cycles were documented.
- Timing of estrus was estimated based on observations and introductions between male and female were planned accordingly.
- The female was trained for voluntary trans-abdominal ultrasound to diagnose pregnancy and track fetal development.
- An Ibox Pro portable ultrasound machine with micro-convex and curvilinear probe was used for exams.
- Fetal heart rate and size including embryonic sac size, skull and spine length were recorded through two full term gestations.
- Weekly ultrasound procedures were continued until the birth of a pup at ~167 d in 2019 and ~160 d in 2020.
- Both parturitions were monitored via live-feed video and behavioral observations were recorded.
- Neonate length and weight were/ will be measured at least weekly until post-weaning at four months of age

Noteworthy Observations

- "Loud sniffing"
 - Introduction to mate
 - Breeding attempted
 - Intromission
 - Aggression towards mate
 - Aggression towards keepers
 - Aggression towards pup
 - Excessive peeing
 - Excessive drinking
 - Increased or decreased appetite
 - Activity levels
 - Ocular excretions
 - Wet vulva*
 - Flicking hair*
 - Vulvar bleeding*
 - Vulvar swelling*
- *specific to female

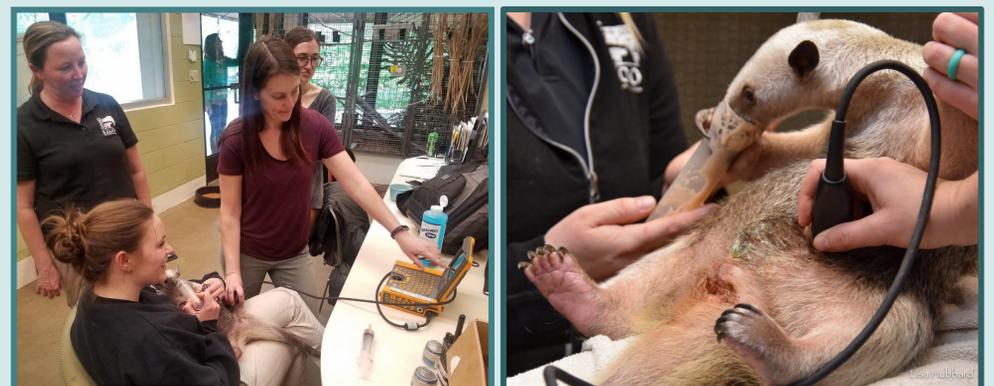
Vulvar Bleeding Key

0	None.
1	Slight traces of blood around vulvar opening. Old, dried blood, or significantly "watered down" looking blood.
2	Fresh/wet blood around vulvar opening, but enough quantity to make a mess with it. "Light bleeding".
3	Enough fresh/wet blood around vulvar opening to leave a trail on furniture. "Normal bleeding".
4	Active bleeding, expelling blood clots, and/or blood in latrine. "Heavy bleeding".

Behaviors and events listed in 'Noteworthy Observations' were specifically focused on for record-keeping.

The vulvar bleeding key was created to ensure consistency among multiple keepers

Ultrasound Exams



Results

- Estrous cycle is ~42-44 +/- 4 days.
 - Estrus lasts approximately 7-12 days and occurs roughly 5-10 days after the last day of vulvar bleeding.
 - Vulvar bleeding occurs ~35-40 days and lasts 7-10 days.
- Physiological indicators of pregnancy include: decrease or absence of vulvar bleeding, swelling of vulva and mammary, and change in overall body physique, including weight gain.
- Appetite and activity patterns became less predictable ~2 weeks prior to parturition.
- Fetal measurements and noted behavioral and physical changes allowed predication of parturition date within 1 week.
- Due to a history of positive reinforcement with keepers, Isla's body position, length of participation, and overall tractability during ultrasound exams allowed for increased accessibility.
- Gestation length differed by ~7 days between pregnancies.
- Labor was approximately ~.5 hours and though both pups were born breech, delivery did not require assistance from keeper staff.



Representative ultrasound images

Image A and B depict a fetus within the embryonic sac from 1st and 2nd pregnancy, respectively. Arrows indicate fetus.

Image C depicts the fetal skull with diameter indicated by the green line.

Image D depicts fetal spine, ribs, and hip bones.

*Measurements were compared to previous pregnancy and those included in Thompson et al. 2017

Conclusions

Literature regarding tamanduas is severely lacking; this data will benefit both management and research staff within our institution and at other facilities housing tamanduas, as it pertains to timing breeding and caring for neonates and pregnant females.



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