

## Utah's Hogle Zoo - Orangutan Birth Management Plan 2014

### **Case History:**

Bornean orangutans Eve and Elijah together have 1 previous offspring, Acara, born May 2005. Eve was parent reared but was separated from her mom and transferred to Utah's Hogle Zoo when she was 5. Elijah was hand reared.

Eve's first birth and pregnancy was in 2005; she was 14yrs old, in very good health and weighed approximately 45kg. Initial signs of labor were noted at noon on May 7. Eve had creep access away from Elijah into the bedroom, and when she entered, she was closed in. After 6 hours, labor stopped progressing. Eve seemed to have stopped pushing, was having fewer contractions and was given two separate oxytocin injections. After 9 hours Eve was immobilized. It was determined that the baby could not be delivered vaginally due to Eve's small pelvis or the infant's large head and a cesarean was the only option. A human surgeon was brought over from the neighboring hospital and delivered Acara. Eve's surgery involved a midline vertical skin incision and a low transverse (aka "bikini cut") incision on her uterus.

Eve rejected initial attempts at introductions with Acara during the first week. She was not aggressive and would just walk away from Acara. Eve did not spend more than a couple minutes looking at Acara. Using operant conditioning with both Eve and Acara, and almost daily introductions between the two for 9 months, they were able to start living together. Acara was pretty independent at 9 months, she shifted herself, came to the door for feedings on her own, and really only sought out Eve for play and reassurance when she was nervous or tired. Staff wanted to make sure the bond between Eve and Acara was strong before attempting the full family reintroduction. When Acara was 2.5yrs old Elijah was reintroduced to the pair and did very well with her. Eve did lactate for a little over a year but never allowed Acara to nurse.

For a SSP breeding recommendation, Eve was taken off of birth control from November 2010 until January 2013 and did not get pregnant. Her cycle coming off of birth control regulated within a month or two and she remained consistent. We have her cycle charted since November of 2010.

Elijah was diagnosed with breast cancer in May 2011. He has been treated with Tamoxifen and is now being treated with Anastrozole, which affects his estrogen. This medication has been shown to help human men who had trouble with fertility. We have gotten samples of Elijah's semen when collecting urine from Eve and looked at it under a microscope; to the untrained eye the samples appeared to be motile.

### **Current Status:**

For the current SSP breeding recommendation, Eve was removed from birth control in January of 2014, and her cycle was regular within a month. She is currently housed with Elijah and Acara day and night.

On March 15, 2014 Eve had 3 positive pregnancy tests: Clear Blue Easy, Accu-Clear Plus, and Equate One-Step. She was 1 week late and her estimated ovulation was February 26, 2014. Labial swelling was noted on March 20, 2014. Her current due date is October 29, 2014 (+/- 12 days).

Elijah and Acara have never been around a new infant. We are not very concerned with Elijah and an infant, as he has shown awareness and gentleness with Acara when she was young. Acara is a spoiled only child and could present problems with the infant, but we hope to be able to leave her in with Eve as this may be her best chance to watch the process before potentially getting a breeding recommendation herself. In addition, we are training maternal/paternal behaviors for Eve, Acara and Elijah.

### **Potential problems:**

It is unknown if orangutans who have had a cesarean section in the past can give birth vaginally in the future. The current Orangutan SSP recommendations are to plan a cesarean section for future births.

Whether Eve has a natural or cesarean section, she could reject a new infant initially.

When Acara wants something her parents have she is often allowed to take it, especially if they are not that interested. If Eve is not sure about the infant or abandons it, Acara could take it.

#### **Staff Assignments:**

**Keeper staff:** Develop a birth management plan. Develop and employ a list of maternal and paternal behaviors each of the orangutans may need to know. Develop a system for pre- and post- partum observations and record keeping. Develop a list of items that may be needed during the process for management and vet staff to obtain. Maintain open communication with management and vet staff throughout the process. Coordinate with IT staff to install a video camera system.

**Management staff:** Provide support for all aspects of keeper staff activities including time and resources. Obtain items that are needed for the process.

**Vet staff:** Develop a relationship with an OB/ Surgeon to be on call for a possible caesarean. Research and decide what the best medical approach will be for delivery. Maintain a good relationship with the animals so their presence during and post-delivery is not stressful.

**Nightwatch:** Potentially monitor overnight video feed of Eve leading up to birth and initially after Eve and baby are spending the nights together.

#### **Building Review:**

We would like Eve to give birth in the sunroom or bedroom, as these are two of her favorite places and provides the easiest access to her should we need to intervene. When her due date is near, all of the exhibits will be heavily bedded with hay. Currently Eve and Acara have a creep to the bedroom overnight. Closer to parturition they will be given a creep to the bedroom and sunroom day and night. When Eve shows signs that labor has begun, keepers will attempt to shift her and Acara into the bedroom and sunroom. If the labor seems to be difficult or prolonged, Eve will be shifted into the sunroom and Acara will be separated and put back with Elijah in case intervention is needed with Eve.

Need to obtain and install a camera system for monitoring when keepers are gone/overnight.

#### **Operant Conditioning Behaviors:**

Behaviors the orangutans already know:

- Arm/other
- Back
- Belly
- Blunt Needle
- Brush Teeth
- Butt
- Chest
- Chin
- Com'ere
- Ear / Other
- Elbow/ Other

- Foot / Other
- Fingers / Other
- Hand / Other
- Head
- Hip / Other
- Hold
- Injection
- Knee/other
- Lay Down
- Lips
- Nipple / Other
- Nose
- Open
- Scale
- Shoulder / Other
- Side / Other
- Sit
- Station
- Target
- Toes / Other
- Tongue
- Trade
- Up

Behaviors that need to be trained or strengthened:

- Pick-up/retrieve (all)
- Rotate items (all)
- Gentle touch (all)
- Nipple manipulation, breast pump desense (Eve)
- Leave it (Specifically Eli and Acara)
- Blood draw (Eve)
- Injection (Eve)
- Abdominal ultrasound (Eve)

### **Pregnancy:**

Eve's cycle is currently tracked closely through urine collection and Hemastix. If Eve misses a menses cycle, pregnancy can be tested with a urine or blood test. Labial swelling is considered the most obvious sign of pregnancy and is generally apparent 2-4 weeks after conception. Usually around the same time nipples may start to enlarge and swell.

Gestation is 245 +/- 12 days (~33-36 weeks). Some common changes during pregnancy are loss of appetite, lethargy, and personality changes. During the later stages of pregnancy some orangutans are noted to have constipation, increased agitation, and fewer social interactions. Lactation and self-nursing can start up to 90 days before parturition.

Diet changes are not usually needed until after birth when the mother starts to breast feed. Eve's weight will be monitored regularly during the pregnancy to assure her diet is okay. Eve is currently on a multivitamin, when she becomes pregnant she will be switched to a prenatal vitamin.

More common pregnancy problems, such as hypocalcaemia, anemia and placenta placement can typically be identified through prenatal ultrasounds and routine blood work to check hematology/serum chemistry status.

### **Signs of Potential Pregnancy Complications Previously Observed in Orangutans**

Observation	Possible Problem
Bloody vaginal discharge (especially large quantities late in pregnancy)	Placenta previa or placenta abruptio
Signs of labor that last more than 6 hours	dystocia or placenta abruptio
thick, creamy, odiferous, or discolored vaginal discharge	uterine infection
Lethargy or anorexia that lasts for more than 6 hours, missing a meal	Pregnancy toxemia

Table 1 (Wells et al, 1990)

**Parturition:**

Labor has been reported to last anywhere between 1/2hr-4hrs depending on health of the mother and the number of offspring. Eve’s labor with Acara was 9 hours before staff intervened. Labor can often happen overnight. During Eve’s labor with Acara signs were first noted at 12:00PM.

Due to Eve’s good health, young age, quick recovery after the first surgery, and length of time since the surgery, the current staff would like to let Eve try to have a natural birth. Vet staff will continue consultation with Orangutan SSP Vet Advisors and human OBs. It is the hope that the birth process will help Eve to accept and nurse the baby. It is also recognized that we do not know for sure why Eve had difficulties with her previous labor and will be ready to intervene immediately if needed again.

*(Excerpt from Como Zoo Birth Management Plan)-*

The labor process is generally comprised of three stages. During the first stage, the female shows signs of discomfort, her activity level increases, and a clear vaginal discharge may be observed. The second phase constitutes the actual birthing process; the frequency of the contractions increases, the female may lie down (dorsally or ventrally), and the infant is expelled in a head-first orientation. The umbilicus is usually severed by the female with her teeth. Finally, during the stage three, the placenta is passed. This may occur immediately, or as late as several hours after parturition. It is not unusual for the female or other members of the orangutan group to eat the placenta. Minor vaginal bleeding or contractions may be observed for up to several days after birth (Sodaro et al, 2006)

**Post-partum:**

*(Excerpt from Como Zoo Birth Management Plan)*

Mothers generally clean the mucus from the infant’s face immediately following parturition, usually with either their fingers or by sucking. Sexual behavior may also be exhibited by the female towards her neonate, such as “dorsal-dorso mounting, oral-genital inspections and manipulation and insertion of fingers into ano-genital areas” (Sodaro et al, 2006). Infants should begin to nurse within 4-6 hours after birth, but in some cases it has been observed to take up to 2 days. The female should keep the infant clinging to her body at all times, usually either to her upper back and head or to her side. She may also spend more time resting than usual during the first few days after parturition, and changes in appetite (either increases or decreases) have been reported (Sodaro et al, 2006).

Infant birth weights vary considerably, ranging from 1420-2040 grams with an average of 1720 grams. They have minimal body fat at parturition, so “the rib cage is prominent and the abdomen may appear sunken” (Sodaro et al, 2006). Passage through the birth canal may cause the infant’s head to initially appear slightly misshapen (Sodaro et al,

2006). The first bowel movement is usually composed of meconium, a thick, dark stool produced *in utero*. Once the infant begins nursing, the stool becomes softer and pale yellow.

Because Acara was delivered by caesarian, Eve has no experience with post-partum infant care. A reintroduction with Acara was attempted the morning after Eve's caesarian and Eve looked at the infant for a minute and then walked away. In order to progress with initial introductions Eve had to be baited to come close to Acara and trained next to her. Initially food had to be placed on Acara to get Eve to touch her. During the introductions there was only 1 instance of Eve showing aggression towards Acara, she picked Acara up by her back hair and then thumped her repeatedly onto the floor. It is hoped that since Eve now has experience with Acara that Eve will be more comfortable with an infant much sooner. It is also hoped that Eve will be able to have a natural birth which may encourage more instinctive behavior.

#### **Pre-partum Preparations:**

- Set up regular meetings with keeper staff, management and vet staff to facilitate communication about the plans for Eve's delivery.
- Research, acquire and install a video monitoring system. *To be completed by June 2014.*
- Train night watch on the camera system. Leading up to her due date set up a schedule with night watch to check on Eve and look for signs of labor. Trained night watch and / or animal care staff with begin 24hr watches by October 12.
- Gather hand rearing supplies: incubator, fluids, formula, bottles, thermometer, nipples, oxygen, blankets, etc. and set up in the Great Ape building. *To be completed by Sept 1, 2014.*
- Continue to work with Eve on blood draw for testing.
- Continue to work with Eve and vet staff for abdominal ultrasound.
- Continue to work with Eve on voluntary injections.
- Complete birth management plan. *To be completed by May 2014*
- Heavily bed the exhibits and holdings. 8-12 inches of hay minimum. *To be completed by October 1, 2014*
- Start allowing Eve and Acara creep access overnight to the bedroom, continue to separate the 3 daily so that it is not a stressful process. *Creep access started April 1, 2014*
- Vet staff will continue to be a part of routine visits and training so their presence is not a stress when Eve is in labor.
- Work up area will be cleaned and set up. *To be completed by October 1, 2014*

#### **Day/Night of birth:**

- Once initial sign of labor are noticed, keepers will shift Eve and Acara into the bedroom and sunroom. If labor is noted at night the Primate supervisor, vet staff and primary keepers will be notified.
- Vet staff will be notified immediately; they will contact the OB and check on Eve as they see necessary.
- Staff will keep the building as calm and normal as possible.
- If Eve stops pushing, labor is not progressing, she has reached the 2 hour mark, or she is in obvious distress, vet staff will intervene.
- Every attempt will be made to keep Acara in with Eve during labor but if Eve shows any sign of abnormal stress or extreme difficulty during the labor process, she will be locked into the Sunroom and Acara will be separated out and put back with Elijah. If Eve is separated out, both Elijah and Acara will remain in visual contact with her. Vet staff will be notified and they will notify the OB if necessary.
- If intervention is deemed necessary, keepers will try for a voluntary injection. Darting will be the last option.
- If the girls are separated for any reason during the process, Acara will be allowed back in as soon as Keepers and Vets feel Eve and the baby are stable. We would like Acara to be a part of as much of the process as possible.

- If intervention is needed we will hope to recover Eve with the baby clinging to her. Introductions will begin as soon as both Eve and baby are deemed healthy enough. Acara was with Eve full time at 9 months. Acara was Eve's first interaction with an infant and it is believed introductions with this infant will go much quicker should it be necessary.

#### **Post-partum:**

- Eve and the infant will be assessed by the vet staff, if the infant is strong and alert the 24 hour watch will continue until all staff is confident that Eve is successfully nursing and caring for the baby.
- If the baby is not observed nursing, staff will use operant conditioning behaviors to teach Eve to nurse the baby.
- If no nursing has been observed within 48 hours, staff will work with Eve to get milk with a breast pump and to bottle feed the infant.
- As soon as staff is confident that Eve and baby are healthy, Eve and Acara will be allowed into the Small exhibit, then the large exhibit.
- As soon as staff is confident that Eve and Acara are comfortable with their role, Elijah will be allowed back with the group. If he has been alone for an extended time he may be put back with Acara first to get his energy out and then with Eve and the baby.
- If at any time the infant seems to be weak or deteriorating, staff will attempt to separate Eve from the infant, or have Eve "trade" the infant through the blood sleeve port for an exam. If these do not work, Eve will be anesthetized.
- If at any time the infant is pulled from Eve it will receive 24 hour care in the ape building near con specifics. Staff will work with Eve to nurse the infant at the door or to obtain milk with a breast pump to feed the infant.
- Soon after the delivery Orangutan SSP will be contacted with an update on how things went.

#### **References:**

- Sodaro, C., Frank, E., Nacey, A., and N. Czekala. "Orangutan Development and Birth Management." *Orangutan Species Survival Plan Husbandry Manual*. Ed. Carol Sodaro. Brookfield: Orangutan SSP, 2006. 76-98.
- Wells, S.K., E.L. Sargent, M. Andrews, and D.E. Anderson. *Medical Management of the Orangutan*. Louisiana: The Audubon Institute, 1990.

Female Orang Research:

- <http://americanpregnancy.org/labornbirth/vbac.html>

Repeat Cesarean	VBAC
Usual risks of a surgical procedure	Less than 1% chance of uterine rupture. If uterine rupture occurs you have risks of blood loss, hysterectomy, damage to bladder, infection, & blood clots
Hospital stay of approximately 4 days	Hospital stay of approximately 2 days
Development of an infection in the uterus, bladder, or skin incision	Risk of infection doubles if vaginal delivery is attempted but results in cesarean
Injury to the bladder, bowel, or adjacent organs	Possibility of tearing or episiotomy
Development of blood clots in the legs or pelvis after the operation	
On-going pain & discomfort around incision	Temporary pain and discomfort around vagina
Small chance that the baby will have respiratory problems <sup>3</sup>	The baby's lungs will clear as baby passes through birth canal
If you plan for many more children, take into account that the more surgeries a woman has had the greater the risk of surgical complications. A fourth or fifth cesarean has more risk than the first or second.	

- <http://www.mayoclinic.org/tests-procedures/vbac/basics/why-its-done/prc-20020457>
  - less likely to get an infection and have serious blood loss with a successful VBAC than with a repeat C-section
  - Repeat C-sections get more complicated each time, while repeat VBACs tend to become progressively easier
- <http://www.bellybelly.com.au/birth/caesarean-section-or-vaginal-birth#.U86DteNdWSo>
  - lower risk of respiratory problems, the contractions of labour help prepare the baby's lungs to breathe air
  - baby plays a part in deciding when the time is right to be born
  - Babies born by caesarean section have a higher risk of respiratory distress syndrome than babies born vaginally at the same gestational age
  - The passage down the birth canal also gives a baby a wonderful all-over massage that wakes up various systems in the body – cranial osteopaths claim to be able to detect whether a baby was born vaginally or by caesarean
  - A mother who has experienced a natural birth can generally walk unaided after the birth and can begin caring for her baby straightaway
- <http://scienceblogs.com/purepedantry/2007/01/31/is-csection-safer-than-vaginal/>
  - there is a chance that the uterus will tear if the woman follows a C-section with vaginal delivery

## The way things really went down-

- Removed from birth control January 2014
- Last period Feb13-18, 2014
- Estimated ovulation Feb 26, 2014, increased breeding Feb 25, 26, 27
- Positive pregnancy tests on March 15, 2014 (Clear Blue Easy, Accu-Clear, and Equate One-Step) (These tests were also repeated May 30<sup>th</sup> and Aug 28 just to test in all 3 trimesters, showed positive every time)
- Labial swelling was noted March 20, 2014
- Estimated due date is October 29, 2014. Our +/- birth window is October 17-Nov 10.
- On Sept 6, 2014 Elijah passed away suddenly due to complications with breast cancer.
- Eve weighed 61.8kg when she got pregnant and weighed about 60.2kg at the end of her pregnancy. Her appetite was low her first two trimesters, started to pick up in the 3<sup>rd</sup> and then dropped again after Elijah passed away. Her lowest weight was 57kg.
- Acara was removed from birth control on Sept 7, 2014. On Oct 4<sup>th</sup> Eve and Acara had a fight where Acara seemed to be the aggressor and Eve seemed to be submissive. They had 7 more fights, ranging from just displacing and displaying to physical interaction.
  - Behaviors seen from Acara: displaying, posturing, piloerection, strong arming Eve, pushing Eve by the head, head butting, biting, pulling hair, clacking/jaw dropping, displacing Eve.
  - Behaviors seen from Eve: displaying, posturing, piloerection, head butting, biting, pulling hair, following Acara, clacking/jaw dropping. Starting seeing head rubbing as a result of hair pulling and Acara pushing Eve's head into a wall. This behavior has turned into an aberrant one and is seen when Eve is nervous or Acara is being shifted in with her.

Acara was put back on birth control on Oct 12<sup>th</sup>. Training and enrichment were increased. We started to separate the two over night on October 20<sup>th</sup>. After consulting with Carol Sodaro and meeting with the team we decided to do a full separation starting October 28<sup>th</sup> until after the baby is born and Eve and baby are doing well. The girls remained in visual access to each other and both seemed significantly calmer.