Assessment of Reproductive Biology in Captive-Housed Female Javan Gibbon (Hylobates moloch Audebert 1797): with Special Emphasize on Ovarian Cycle Determination and Daily Activity Observation

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Abstrak

Javan gibbon (Hylobates moloch AUDEBERT 1797) is one of at least thirteen species of gibbons, which make up the Family Hylobatidae (Groves 2001: 289). The Javan gibbon is endemic to Java, Indonesia and now found only in fragmented forest tracts in the western and central portions of the island. As such, the conservation of this species has 'become a high priority for the government of Indonesia and the World. Habitat loss combined with illegal hunting and live capture has reduced the-Javan gibbon numbers in the wild to under 5000 individuals. Javan gibbon populations in zoos worldwide number less than 10 successful breeding pairs and live births have been extremely rare. The reasons for the low breeding success among captive Javan gibbons is not well understood but are likely to stem from a very limited knowledge of the basic reproductive biology/behavior. Expansion of genetic diversity and animal numbers in demographically isolated captive and wild populations are urgently required. Therefore, studies addressing female reproductive biology, particularly in providing data on the ovarian hormone profiles during ovarian cycle so to determine optimal mating time for assisted breeding, are a high priority.

This study aims to provide a detailed knowledge of basic reproductive biology in female Javan gibbons in captivity which is vital to promote population growth in captivity. This study was carried out to : (1) deine the endocrinology of the ovarian cycle in Javan gibbon by direct measurement of estradiol and progesterone in serum samples, (2) use serum hormones profiles to detennine the ovarian cycle and to predict the fertile phase of the cycle or Optimal Mating Time (GMT), (3) characterize the changes in vaginal epithelium and genital swelling, (4) evaluate cytological changes as Maturation Index (Ml), (5) correspond the similarity pattern of MI and genital swelling during ovarian cycle related to ovarian hormone profiles, and (6) monitor the time allocated to primary daily activity by captive-housed female Javan gibbons (Hylobales moloch) during their sexual cycle that live in pair to distinguish estrous period fiom anestrous one. This study was carried out from June 2003 to December 2003 for daily activity observations at Schmutzer Primate Center, Ragunan Zoo, Jakarta and Taman Sari Zoo, Bandung, and from September 2004 to April 2005 for blood sampling at Ragunan Zoo, Jakarta and Taman Sari Zoo, Bandung.

This is an exploration research that was conducted by daily observation and followed by blood sampling. Cycle status of all females was assessed daily by rating genital swelling following Czekala & Sicotte (2000: 210). Visual inspections of each gibbon sexual skin were observed daily for sign of swelling at 10 to 20 cm distance, while the animals are in caged as suggested by Heistermann et al. (1996: 845). The degree of wrinkling and the size of the labia minora will represent the primary physical features for evaluating changes in sex skin swelling during) the menstrual cycle. Four grades of were scored: 1 - no swelling; 2 - slightly swollen; 3 - nearly full swelling; 4 - fully swollen with additional coloration; Observations and sampling were conducted 2-month period that covered one complete ovarian cycle. Blood samples and

vaginal swabs were taken at intervals of 3 to 4 days for the 2-month period. All sampling were conducted while the animal was under kethamine sedation; approximately 3 ml of blood was drawn from the femoral vein per sample. Blood collection was conducted by an experienced veterinarian or veterinarian technician on staff at the respective zoo in accordance with approved animal care and use protocols. Serum was drawn oif and stored in sealed vials at -20°C prior to EIA analysis to measure estrogen and progesterone levels during the ovarian cycle.

Daily observation was conducted to see how the limited area will influences their behavior including their reproductive behavior related to their hormonal regulation. Daily observations were divided into 2 (two) conditions, i.e. daily activity during esuus and during anestrus phase of the cycle. The vaginal morphology scores used to define estrus and anestrus phase. Estrous females were judged when the swelling scores were more than 1. The daily activities of 2 (two) female gibbons which were paired in each captivity were recorded base on ad-libitum method (Altmann 1974: 235). Observations were made by one observer, on an average of 5 to 6 days per week from 09:00 a.m. to 03:00 p.m. The Scan Sampling Method with five minutes duration for each sample point was used (Altmann 1974: 259), during visiting hours at both captivities. To measure the activity budgets, Dunbar (1988) methods was used. Activities of the animals were recorded, namely resting, moving, feeding, and grooming (in Matsumoto-Oda &. Oda 1998: 160), plus calling activity was added to be recorded, since gibbon?s calling is significantly spent during activity.

Results of this study were concluded as follows: The secretion patterns of estradiol and progesterone in serum Samples gave a reliable reflection of ovarian activity in captive-housed Javan gibbon. The range concentrations in cycling females of estradiol were 47.64 to 104.35 pg/ml and of progesterone were 0.5 to 10 ng/ml. The length of ovarian cycles was found to be 29 and 38 days, with follicular phase ranged from I9 to 24 days and luteal phase ranged from 7 to I2 days. The Optimal Mating Time was lasted 3 days after the day of estradiol surge or first day that progesterone levels begin to rise. From this study, two cycling females (0wa 1 and Owa 2) from Ragunan Zoo, displayed the lengths of the ovarian cycle ranging between 29 to 38 days. Two other females which live with their partners (Ulah at Schmutzer and Donna at Taman Sari Zoo) also displayed the length of the ovarian cycle by genital swelling observation. Their ovarian cycle length ranged between 29 to 30 days (for Ulah) and 26 to 36 days (for Donna). Despite the small sample and variability among animals, the limited subject animals using in this study gave an average ovarian cycle length of 315: 4.23 days, almost similar with other higher primates and human.

This study also found that genital swelling indicated correlationwith fluctuated estradiol values and could be useful as external marker to predict fertile phase of the cycle. The pattems of vaginal cytology were not consistent in all subjects during sampling period, theneafterthe patterns of comilication did not reliably reflect the physiological status ofthe animal, in contrast to many other species. Superficial cells presented throughout the cycle during sampling period corresponded with estrogen levels which never reach basal values.

Cycling female gibbons that live with their partners, demonstrated that in eslxous period, female tended to spend more time on calling, moving, and grooming. The dominant time spent on daily activity was for moving, that include brachiating leading to accommodate consortship behavior. Time spent for moving

shown significantly different between estrus and anestrus, while feeding was less significant because of the availability of the food in captivity. They were more active in estrous than in anesmous condition.