FAECAL ASSAY TO DETERMINE THE REPRODUCTIVE STATUS OF CAPTIVE FEMALE ASIAN ELEPHANTS

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The reproductive status of selected captive Asian elephants (*Elephas maximus*) in Sri Lanka and the United States of America (USA) were determined using faecal progestagen assays from 2008 to 2010. Cyclicity appeared to be highest in facilities, which managed them as herds. Previous reports on reproductive status of captive Asian elephants states that populations in North America were not self-sustaining, and the trend in Sri Lanka appears to be declining. Therefore, increased captive breeding needs to take place for them to be self-sustaining. Routine monitoring of the reproductive cycles of the females is essential to achieve successful captive breeding populations. The reproductive monitoring through invasive sampling techniques is of high importance and the main aim of this study was to monitor the reproductive status of captive female Asian elephants in USA and Sri Lanka. In addition, the factors related to reproductive viability of captive females was another objective of this study. Due to the need of a properly functioning routine reproductive monitoring system, its applicability was explored for the Sri Lankan context.

Faecal samples collected from captive female Asian elephants at weekly intervals were extracted using the Methanol Vortex Extraction. The Enzyme-linked Immunosorbent Assays were conducted on the extracted samples, and then the statistical correlation was performed between faecal and serum progesterone values to determine whether there was a significant relationship between the two parameters using a Linear Mixed Effect model (LME). Cyclicity status of each sampled elephant was determined and the results of each study site were compared, using a Fisher's Exact test, based on the country and the herd or non-herd status of the captive facility.

A significant association between serum progesterone and faecal progestagen patterns has been observed ($p < 0.001$) from the LME model analysis. The lengths of the luteal and follicular phases were 10.0±1.4 weeks and 4.5±1.3 weeks respectively for the elephants studied in Sri Lanka. The females in the USA had luteal and follicular phase lengths at 9.3±1.5 weeks and 5.9±0.9 weeks respectively. Both countries had reproductively viable (either cycling, pregnant, or lactating) populations, 81% in USA, and 85% in Sri Lanka. The Fisher's Exact test indicated that herd-living significantly favours a higher reproductive viability ($p < 0.05$). However, the Fisher's exact test indicated that there was no significant difference between the USA and Sri Lanka regarding captive female Asian elephant reproductive viability ($p > 0.05$).

While serum samples would convey more accurate hormonal results, this project demonstrated that properly conducted faecal assays are reliable indicators to monitor the reproductive status of female Asian elephants. The lengths of luteal and follicular phases were consistent with the previously published literature. Although the entire North American population has been found to be not self-sustaining, the studied populations in the USA (the Ringling Bros. and Barnum & Bailey Circus® and their Center for Elephant Conservation®) could be regarded as exceptions, given the routine monitoring and number of births that occur at those facilities. Despite the Pinnawala Elephant Orphanage (PEO) in Sri Lanka is having a healthy population of elephants with a proven success in breeding, the reproductive status of Sri Lankan captive population as a whole remains unknown, especially of those under private care. Thus, the need to monitor the reproductive viability of captive female elephants is critical, if the problem is to be resolved. Given the practicability and reliability of the faecal progesterone assays to assess the reproductive status of the females correctly, a properly planned reproductive monitoring system on captive elephants would be a timely addition for the captive elephants in Sri Lanka to become self-sustaining.