ENDOCRINOLOGICAL, BEHAVIOURAL AND MORPHOLOGICAL CHANGES ASSOCIATED WITH PUBERTY AND SEXUAL MATURITY IN FEMALE ELEPHANTS AT PINNAWELA ELEPHANT ORPHANAGE

By

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Abstract

Though the elephants have lived among and worked with humans for thousands of years there has been little interest shown in breeding elephants. Rather these captive stocks have traditionally been replenished by capturing replacements from the wild when required. This practice is no longer allowed as the Asian elephant has been listed as vulnerable for extinction (IUCN, 1997).

Therefore captive breeding is a viable solution to maintaining the sustainability of these elephant populations worldwide. Routine hormone monitoring, particularly use of progestagen analyses to assess cyclicity, is the key to developing a successful breeding programme. Therefore information and data from puberty to senescence of the female elephants has to be collected. To fill in the gap of knowledge on puberty in Asian elephants, hormone profiles and related behaviours and phenotypic changes were documented. This study was carried out at the Pinnawela Elephant Orphanage (PEO) where a herd of elephants lives in semi- captivity and breeds successfully.

As the study group, 11 female elephants within the age of 3.5 to 15 years were selected and trained for blood collection and standing for body measurements. Blood samples were collected from these animals at 10 day intervals for 22 months. Serum was stored in a freezer at -20°C. All the Morphological changes were recorded monthly such as shoulder height, length and weight (weightronics), body skin colour by comparing with the previously prepared colour card, depigmented areas, by marking on the previously sketched faces and obtaining the digital pictures to compare the shape of the body.

Behaviour of the study group and interactions with herd mates were observed and recorded daily for 4 hours.

The serum samples were analysed using progesterone EIA technique and it was found that 6 females in the group were already cycling. Three started cycling during the study period at the age of 4.5 to 7.5 years. There were no quantitative or qualitative differences in characteristics of the estrous cycle of an adult and the first cycle at the onset of puberty (cycle length ±SD 105.0 ± 6.6 days; luteal phase, 69.3 ± 11.1 days; follicular phase, 35.8 ± 4.5 days; peak progestagens, 2.33 ± 0.56 ng/ml).

The behaviours related to the first estrous cycle at the onset of puberty were observed in all 3 elephants that started cycling during the study period. These behaviours included walking longer distances, heightened bull attentiveness to the female, increased willingness of the female to be mounted and mated by bulls, and were similar to those of the post pubertal animals in estrus. Of the 46 cycles observed among the 11 elephants during the 22- month evaluation period, 78% of the estrous cycles were associated with clear behavioural changes.

There was no significant effect on body colour and the depigmentation or shape of the body on puberty. The mean body weight ± SD was 1078 kg ±135 kg at puberty. The mean height and length were 1.91 m ±0.13 m and 2.66 m ± 0.14 m respectively.

In conclusion, serum progestagen monitoring is effective in determining age of puberty in elephants, even those managed under semi-captive conditions such as those at the PEO. Females appear to initiate cyclicity as young as 4.5 years of age, several years earlier than in the wild. Daily behavioral observations can aid in the detection of estrus, but probably only if animals are managed in a herd setting with access to bulls. Identifying the age at which ovarian cyclicity begins would be a valuable management tool to prevent unwanted pregnancies in very young females.