

NS.VET.1

## **AN ASSESSMENT OF THE STRESS LEVELS OF CAPTIVE ELEPHANTS HELD UNDER DIFFERENT MANAGEMENT CONDITIONS USING SERUM CORTISOL LEVELS**

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Captive elephants are susceptible to various stresses present in their captive environment. The level of stress experienced by captive elephants could vary between different facilities depending on the management practices adopted. This study was conducted to test the hypothesis that stress levels experienced by captive elephants vary between captive facilities with different management practices in Sri Lanka.

The elephants for this study were from the National Zoological Gardens, Pinnawela Elephant Orphanage and Millennium Elephant Foundation, facilities that have distinctly different captive management practices. Animals at the National Zoological Gardens are kept chained most of the day. Elephants at the Pinnawala Elephant Orphanage are allowed to walk and engage in intra-specific behaviours. Elephants at the Millennium Elephant Foundation are used for tourist rides. Therefore, the highest stress levels were expected at the National Zoological Gardens and the lowest at Pinnawela Orphanage. The stress levels of elephants from the above three facilities were determined by measuring their serum cortisol levels using radio-immunoassays. First, diurnal changes in the serum cortisol level of elephants were determined, at four hour intervals, to identify the peak secretion time. Next, serum cortisol levels at the peak secretion time of elephants from the three facilities were determined.

Peak mean serum cortisol level (132.38 nmol/L, n=5) was observed at 0800h, which is consistent with observations made elsewhere for elephants. Therefore, 0800h was chosen as the optimum sampling time for the cortisol-based stress study.

In contrast to our prediction, there were no significant differences (Kruskal-Wallis,  $H=1.71$ ,  $df=2$ ,  $P > 0.05$ ) among mean serum cortisol levels of the elephants at the National Zoological Gardens ( $88.06 \pm 9.31$  nmol/L, n=16), Pinnawala Elephant Orphanage ( $87.27 \pm 10.13$  nmol/L, n=8) and Millennium Elephant Foundation ( $76.05 \pm 17.21$  nmol/L, n=8). Therefore, it can be concluded that there is no difference in the cortisol-mediated stress response in elephants held under these three different captive conditions.