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THE BODY CONDITION OF SRI LANKAN DOMESTICATED ELEPHANTS (*ELEPHAS MAXIMUS MAXIMUS*)

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SUMMARY

The body condition of domesticated Sri Lankan elephants has not been scientifically evaluated although many believe that it is poor. The objective of this study was to evaluate the body condition of domesticated elephants in Sri Lanka using an index developed by Wemmer and Krishnamurthy (1992). This method of assessing relies on visual assessment and numerical scoring of six criteria (temporal depression, scapula, thoracic region, flank area, lumbar vertebrae and pelvic bone) resulting in a scale of 0-11. The study was conducted between 1st April 1993 and 1st April 1994 in 13 administrative districts using 140 domesticated elephants. The results show that the mean body condition index of the present day domesticated elephants is 6.95 ± 0.26 points (mean ± SEM). Males had significantly lower body condition index (6.63 ± 0.22 points) than that of females (7.3 ± 0.21 points) and there was no significant (r=0.398, p=1, n=140) correlation between the age and the body condition index of elephants. Further, the body condition index was not significantly different between the elephants which were owned by private individuals or temples and dewales (p=0.71) and maintained by the mahouts or the owners (p=0.21).

Key words:*Elephas maximus maximus*, body condition, Sri Lankan elephants, Sri Lanka

INTRODUCTION

A proper scientific assessment of body condition in elephants is desirable, since it reflects the nutritive and health status of the animal. The health status of wild African elephants has been assessed by several workers using different methods (Eltringham, 1982). On the other hand, very few attempts have been made to quantitatively measure the body condition of Asian elephants (Wemmer and Krishnamurthy, 1992).

In African elephants, the body condition has been evaluated using height to weight ratio, kidney fat index, fat contents of bone marrow, and serum analysis (Eltringham, 1982). However, such methods generally have logistic problems as handling of animals, taking measurements and collecting samples can be a difficult task. Further most of these techniques are invasive, time consuming and expensive to carry out. The results obtained are often inconclusive.

In Sri Lanka, as yet, no attempts have been made to assess the body condition of either the wild or the domesticated elephants. However, many believe that the body condition of domesticated elephants in Sri Lanka is poor. Therefore, the aim of the study was to determine the body condition of domesticated Sri Lankan elephants using the method described by Wemmer and Krishnamurthy (1992). This is a novel, non-invasive method which relies solely on visual assessment criteria. In this method, numerical scoring of six body regions is made which totals to give a cumulative body condition index ranging from 0-11 points. In this method, the body condition is claimed to be directly proportionate to the numerical score. The method is easily learnt, can be performed rapidly, and does not involve

difficult sampling techniques. Further the observer can easily view the animal from different angles. This method had been used previously to assess the body condition of Indian and Burmese elephants (Wemmer and Krishnamurthy, 1992).

MATERIALS AND METHODS

This study was carried out during the period April 1993 to April 1994. The sample consisted of 140 domesticated elephants of which 72 were males and 68 were females. These elephants were from 13 of the 24 administrative districts of the country [nine in wet zone (Galle, Matara, Colombo, Gampaha, Kalutara, Ratnapura, Kegalle, Nuwara-Eliya, Kandy), three in intermediate zone (Kurunegala, Matale, Moneragala) and one in dry zone (Anuradhapura)]. These animals were either owned by private individuals (106 elephants) or temples and dewales (30 elephants) and were maintained either by the mahouts (30 elephants) or by the owners (110 elephants).

The ages of the elephants were obtained from their respective mahouts or owners. The body condition assessment was carried out at the elephant working sites or when brought to participate in peraheras or at owners residence and temples.

The elephants were made to stand in a place where maximum possible overhead sunlight reached the animal's body. The body condition was assessed according to criteria given in Table 1`. When a particular body region (temporal depression, scapula, thoracic region, flank area, lumber vertebrae and pelvic bone) is intermediate between the two criteria, an intermediate point score (i.e. 0.5, 1.5) was assigned. This was done by viewing the body regions from different angles. While doing this, the mahout's assistance was sought to move the elephant.

In this method, if the body condition index is between 0-5 points, the elephant is considered to be emaciated condition; if it is between 6-10 points the elephant is considered to be in average condition; if it is 11 points or more than 11 points the elephant is considered to be in very good condition.

The results are expressed as means ± SEM. Statistical comparisons were made using Mann Whitney U test and Spearman Correlation. Probabilities with $p< 0.05$ were considered as significant.

RESULTS

The overall mean age of the elephants was 37.4 ± 1.4 years (range; 3-75, mode; 45, median; 42). The mean age of males was 34.2 ± 2 years (range; 3-70, mode; 45, median; 36.5) and that of females was 40.76 ± 1.8 years (range; 6-75, mode; 45, median; 42.5). This difference between the two means was not statistically significant (Mann Whitney U test, $p=0.08$). The mean body condition index of all elephants in the study was 6.95 ± 0.26 points (range; 3-11, mode; 8, median; 7). The mean body condition index of males was 6.63 ± 0.22 points (range; 3-10, mode; 6 & 7, median; 7) and that of females was 7.3 ± 0.21 points (range; 3-11, mode; 8, median; 7). This difference between the two means was statistically significant (Mann Whitney U test; $p=0.039$). No significant correlation was found between the body condition score and the age when both sexes were pooled ($r=-0.398$, $p=1$, $n=140$) or when the sex data were treated separately (males $r=-0.445$, $p=1$, $n=72$: females; $r=-0.458$, $p=1$, $n=68$).

The mean body condition index of elephants owned by temples and dewales was 7.03 ± 0.31 points (range; 3-11, mode; 7, median; 7) and that of private owned elephants was 6.9 ± 0.18 points (range; 3-11, mode; 8, median; 7). This difference between the two means was not statistically significant (Mann Whitney U-test; $p=0.71$). The mean body condition index of the elephants maintained by their owners was 6.84 ± 0.18 points (range; 3-11, mode; 8,

median; 7) and that of the elephants maintained by mahouts was 7.36 ± 0.26 points (range; 4-10, mode; 8 median; 7.5). This difference between the two means was also not statistically significant (Mann Whitney U test; p=0.21).

DISCUSSION

This is the first study conducted in Sri Lanka, which assessed the body condition of domesticated Sri Lankan elephants (*Elephas maximus maximus*). In this study, the body condition was determined in 140 domesticated elephants, which is a sizeable number to provide meaningful data: current number of domesticated elephants reported in Sri Lanka being 344 (Jayewardene, 1994).

According to the results of this study the overall mean body condition index of the domestic elephants was 6.95, which indicates that the body condition of Sri Lankan domesticated elephants is good, contrary to the common belief that it is poor.

The body condition index of the Asian elephants in South India (*Elephas maximus indicus*), Nepal (*Elephas maximus indicus*), and Myanmar (*Elephas maximus birmanicus*), determined by this method was 7.3 which is slightly higher than that reported here (Wemmer and Krishnamurthy, 1992). It is possible that this difference in body condition may result from subspecies differences, as it is known that physiological, morphological differences exist between sub species (Ratnasooriya et al. 1992). Alternatively, this slight difference in body condition index may have resulted from the different conditions in which the animals are kept for example, in Sri Lanka domesticated elephants are usually kept in temples and dewales, or residences of owners or mahouts. While in Wemmer and Krishnamurthys' study (1992) the elephants in India were selected from sanctuaries and those in Burma from timber camps.

In contrast to the study of Wemmer and Krishnamurthy (1992), in the present study the mean body condition index of males was significantly lower than that of females. Some of the male elephants (eight) in this study were in the immediate post-musth period. This could be one reason for this observation. In Sri Lanka, in domesticated elephants the musth period lasts about two to five months (Ratnasooriya, 1990) and during this period the bull is aggressive, disobedient, extremely dangerous, and therefore restrained with chains away from contact with people (Eisenberg et al., 1971). In such a situation the animal is obviously in stress. Stress is known to deteriorate body condition in animals including elephants (Fowler, 1986). Further, the appetite of the musth elephant is claimed to be poor (Gale, 1973; Lincoln & Ratnasooriya, 1996) and it is not possible to give their daily bath and routine cleaning making their body condition even poorer. However, according to Jainudeen et al (1972) there is no reduction in food consumption even at peak musth. Secondly, the lower body condition index of males may result from the higher workload performed by the males compared to females. However, it is of interest to note that there is no significant difference in the number of days per month used in work between male and female domesticated elephants in Sri Lanka (Godagama, 1996). Thirdly, this difference in body condition may result from the higher mean age of the males as compared with the females, since older elephants generally show a poor body condition (Evans, 1910). However, this possibility seems unlikely as there was no significant age difference found between the males and the females: mean age of males 34.2 years and mean age of females 40.76 years. Thus at present, it is difficult to pinpoint the precise reason/s for this difference in mean body condition between males and females as observed in this study.

In the study of Wemmer and Krishnamurthy (1992) as well as in the present study there was no significant correlation found between the age and the body condition index of the elephants. Lack of correlation between age and body condition in their study possibly could have resulted due to presence of greater proportion of younger animals in their sample, as greater variation in body condition would be expected in a population of middle aged and reproducing elephants (Wemmer and Krishnamurthy, 1992). However, this seems unlikely in this study because the mean age of elephants was 37.4 years and mode was 42 years.

Another interesting observation made in this study was that the body condition of domestic elephants was not dependent on whether the elephants were owned by private individuals or temples and dewales or maintained by the mahouts or owners. There was no significant difference found between body condition of elephants maintained by individuals and by temples, dewales and elephants maintained by mahouts or by owners.

In conclusion, this study, for the first time, shows that the overall body condition index of Sri Lankan domesticated elephants is average and certainly not poor as popularly believed.

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Table 1
Criteria and points used to assess body condition in domesticated elephants (*Elephas maximus maximus*)

Character	Description	Score
1	**Head: temporal depression (view from several angles)**	
	deeply concave, frontal ridge forms a crater-like rim around the temporal depression	0
	Slightly to moderately concave, frontal ridge defined	1
	full and convex in outline viewed from behind , frontal ridge vaguely outlined at best	2
2	**Scapular (Shoulder blade) view from side**	
	spinous process pronounced and bladelike with the acromial process pronounced as a knot	0
	spinous process visible as a vertical ridge with a concavity between the ridge and the posterior edge of the scapula	1
	spinous process not visible, or slightly visible when the leg is in certain positions	2
3	**Thoracic region (view from the side)**	
	many ribs strongly demarcated (even behind the scapula) with pronounced intercostal depressions	0
	some ribs visible, but the extent and demarcation not pronounced	1
	ribs not visible, barrel smooth	2
4	**Flank area (immediately in front of pelvis) (view from the side and behind)**	
	depression visible as a sunken area immediately in front of the pelvis	0
	no depression visible, flank bulges outward in front of the pelvis	1
5	**Lumbar vertebrae (behind ribs and in front of pelvis) (view from behind an elevated vantage point may be necessary)**	
	visible as a knife like blade: sides of the spinal ridge are parallel, and the height exceeds the width.	0
	visible as a ridge: skin slopes away from the top of the ridge: height of the vertebrae does not exceed width	1
	not visible (or slightly visible); rump region between ilium and caudal vertebrae filled with tissue (and not forming a depressed zone)	2
6	**Pelvic bone (External angle of the ilium and rump) (view from several angles)**	
	visible as a jutting bone; rump is a pronounced sunken zone between the ilium and caudal vertebrae	0
	Visible but not pronounced ; the rump is a slightly depressed zone between the ilium and the caudal vertebrae	1
	not visible (or slightly visible); rump region between illium and caudal vertebrae filled with tissue (and not forming a depressed zone)	2