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Eye colour of Sri Lanka elephants *(Elephas maximus maximus)*

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Abstract

The aim of the study was to investigate and scientifically document the eye colours of Sri Lankan elephant *(Elephas maximus maximus).* This was done using 123 domesticated elephants (64 males and 68 females) between April 1993 and April 1994 in 13 of the 24 administrative districts of the country. Both eyes were examined for the colour of the iris, and the sex and morphotype of each animal was noted. The results show two eye colours, brown [113 (91.8%): males 57, females 56)] and gray [10 (8.2%): males 7, females 3] Brown had three shades; dark brown (12.2% : Atha =o, Aliya 5, Pussa 1, Athinna 3, Alidena 6), light brown (59.3% : Atha 9, Aliya 23, Pussa 4, Athinna 19, Alidena 18) or honey (20.3% : Atha 1, Aliya 6, Pussa 1, Athinna l, Alidena 2).

Key Words : Sri Lanka elephant, *Elephas maximus maximus,* eye colour.

1. Introduction

Two sub species of Asian elephants (*Elephas maximus*) are endemic to Sri Lanka. (1, 2). One sub species (*Elephas maximus maximus sinhaleyas*) is already extinct and the other (*Elepahs maximus maximus*) is threaten (1).

Therefore, scientific documentation of any data related to the living subspecies and confirmation of previously reported findings becomes crusial. In this regard we have documented haematological values (3, 4) pregnancy duration (5), baseal serum testosterone (6), prolactin (7) cholesterol (8) and glucose (9) levels, testosterone secretion in relation to musth behaviour and social dominance (10), defecation pattern, (11) rectal temperature (12), body condition (13), presence of arcus senile like structure in the eye (14), toe nail distribution (15), spinal conformation (16), eye defects (17), body injuries (18), diet (19) and social behaviour and breeding physiology (20) using capive animals.

In this paper we document the eye colout of Sri Lankan elephants using a large sample of domesticated animals distributed throughout Sri Lanka (except North and South) 13 of the 24 administrative districts.

2. Materials and methods

This study was carried out during the period of April 1993 and April 1994. The sample consisted of 123 domesticated elephants (64 males and 59 females) having no eye defects, such as cataract of the lens, corneal opacities in the form of non transparent cloudiness, scars or keratitis. These elephants were from 13 of the 24 administrative districts of the country, nine in the wet zone (Galle, Marata, Colombo, Gampaha, Kalutara, Kegalle, Nuwara Eliya and Kandy), three in the intermediate zone (Kurunegala, Matale and Monaragala) and one in the dry zone (Anuradhapura).

Information regarding the address of owners and mahouts was initially obtained from Ven. Galaboda Gnanissara Thero, the chief incumbant of the Ganagaramaya Temple, Hunupitiya, Colombo 02, who has organized the Nawam Perahera, a cultural pagent in colombo, since 1979. Later, some information was also received from some elephant owners and mahouts during the course of data collection. The selection of the elephants was on an oppotunistic basis rather than on random basis as there were no proper registers of domesticated elephants to choose from. Another reason was that in some areas domesticated elephants were sparsely distributed and whenever one was located, it was subjected to examination.

The observations were made at the elephants' working site, at owner's residence, mabout's residence, temples, dewales and when they were brought to participate in peraharas (the Colombo Nawam Perahera, the Kelaniya Duruthu Perahera, the Bellanwila Esala Perahera, the Kandy Esala Perahera and the Esala Perahera and the Esala Perahera of Alutthnuwara Dewale).

The elephants were made to stand where maximum possible overhead sunlight reached the head region of the animals and iris of both eyes were examined for colour in the presence of their respective mahouts. The sex of the animals was also noted.

The number of male elephants belonging to the three morphotypes (the 'Atha' or tusker, 'Aliya' or male elephant with tushes and the 'Pussa' or male elephant without tusks or tushes) and the numbers of females belonging to the two morphotypes (an ' Athinne' or female with tushes and an 'Alidena' or female without tushes), as described by (2) were recorded.

3. Results

Of the 123 elephants investigated 64 (52%) were males and 59 (48%) were females. Among the males 10 (16%) were 'Athas' 48 (75%) were 'Aliyas' and 6 (9%) were 'Pussas'. On the other hand, 27 (46%) of the females were 'Athinnes' and 32 (54%) were ' Alidenas'.

Table depict the total number and distribution of the eye colour of these elephants.

Table 1. Distribution of eye colours of 123 domesticated Sri Lankan elephants

Eye Colour	Total	%Total	No. of Males			No. of Females	
			'Atha'	' Aliya'	' Pussa'	'Athinna'	Alidena'
Dark Brown	15	12.2	0	5	1	3	6
Light Bowon	73	59.3	9	23	4	19	18
Honey	25	20.3	1	14	0	4	6
Gray	10	8.2	0	6	1	1	2

As shown, most of the elephants 73 (59%); (36 males and 37 females) had light brown coloured eyes. Twenty five (20%) elephants (15 males and 10 females) had honey coloured eyes. Fifteen (12%) elephants (6 males and 9 females) had dark brown eyes and 10 (8%) elephants (7 males and 3 females) had gray coloured eyes.

4. Discussion

This is the first comprehensive scientific study, conducted using large numer of domesticated animals (123 individuals) apperently having no eye defects, to examine the eye colour of Sri Lankan elephants. In Sri Lanka, about 27% of the domesticated elephants have eye defects (17). Previously

Deraniyagala (2) has reported eye colour of Sri Lankan elephants using a small sample without giving any description on the methodology used. Further, in his study (2), the distribution of the eye colours amongst the elephants are given only gender wised and no attempt has been made to provide data in terms respective morphotypes.

The results of this study demonstrate that there are two main eye colours in Sri Lankan elephants, namely brown and gray [eye colour of mammals is due to melanin pigment present in the iris which is visible coloured part of the eye (21). Further, amongst the brown, three shades were distinguished: light brown, dark brown and honey. Interestingly, in humans two eye colours are noted: brown and blue (21).

In the Sri Lankan elephants, irrespective of sex or morphotype the most predominan eye colour was light brown (73%) and the least predominant was the gray (8%). This is incontrast to Deraniyagala (2) who has reported only brown colourd eyes (38 males) with no gray coloured eyes. Further, according to him (2) the most predominant type was brown (presumably honey). Obviously, these differences can be attributed to differences in the colour criteria used in the two studies or due to small sample size examined by Deraniyagala (2). In complete contrast, Gale (22) has indicated that serveral shades of eye colours are present in Burmese elephants ranging from dark brown to purplish blue and he further states that the commonest was dark brown and purplish blue is extreamly rare. However, Gale does not give the number of animals belonging to each colour category. Methodological differences may account for most of the differences between Gale (22) and this study. A taxon differences could also be another possible reason for this differences between the two studies: Burmese elephants belongs to *Elephas maximus brimanicus* whilst the Sri Lanka elephants belongs to *Elephas maximus maximus*. In this regard, it is note worthy that difference in body temperature (12) and serum cholesterol levels (8) are recorded between *Elephas maximus maximus* and *Elephas maximus indicus*.

In conclusion, this study showes that the Sri Lankan elephants have either brown (with different shades: dark brown, light brown or honey) or grey eyes. The predominate type is brown.

5. Acknowlegements

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