A preliminary study of the captive elephants in Sri Lanka

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Background

Collection of data on captive elephants was initiated during the Navam Perehera held in Colombo in the month of February 1991. A total of 139 elephants took part in the Perehera on the nights of 27th and 28th of February but data were obtained on only 125 of them. The data were collected by filling a specific data form for each animal and the form itself was prepared by FI especially for this purpose. The relevant data on each animal were filled on these forms while identification photographs were taken simultaneously for later reference. All this was done during day time on the 26th, 27th and 28th while the elephants were tethered at the Viharamahadevi Park.

Subsequently in July 1991 data were obtained on an additional 56 captive elephants during the Esala Perehera in Kandy. As the elephants brought for the Kandy Perehera were not confined to one central location but were scattered around the city and its periphery, data collection was somewhat limited. The data were collected on the 17th, 18th and 26th of July 1991.

These two stages of the survey enabled the FI team to obtain data on a total of 181 domesticated elephants from around Sri Lanka.

Objectives of the survey

This survey was carried out as the initial phase of an all island survey of captive elephants, elephant owners and mahouts in Sri Lanka. The data were gathered at this stage with two main objectives in mind;

1. To record as much detail as possible on domesticated elephants as the initial phase of a statistical census on captive elephants in Sri Lanka.

2. Through collection and analysis of data on the physical features and distinguishing characteristics of captive elephants, to investigate the possibility of applying the same criteria or parameters in the identification of elephants in the wild.

Data collection

The necessary data were collected by filling a separate data sheet for each elephant and taking two corresponding photographs of each animal (front and side view) for later reference. The parameters under which data were collected can be categorised as follows;

1. Name of elephant and identification number.
2. Name and address of owner.
3. Name and address of mahout.
4. Age of mahout, number of years working as a mahout and duration with present elephant.
5. Sex, age and height of elephant.
6. Details on physical features of elephant tusks, head, ears, trunk, tail, depigmentation and shackle marks.
7. Behavioural characteristics of elephant - aggression, musth etc.

8. Food-quantity, composition, preferences.
9. Utilization - nature and duration of work done.

Data analysis

the data collected was transferred from the data sheets to a computer data base. All the different categories of data were entered into two data files created specially for storage and analysis of this data. While one data file contains all data relevant only to the elephants, the other data file contains data pertaining to the owners and mahouts.

The data in the file containing details on the elephants was analysed mainly with reference to physical features, age structure, behaviour, food, utilization and names given to domesticated elephants in Sri Lanka. The data in the file containing details of owners and mahouts were analysed separately to get an idea of the traditional system in which tame elephant are cared for in the island, including the age structure of mahouts and the duration of time they are engaged in this specific occupation.

Results

The results obtained by analysing the data collected on 181 elephants in this preliminary survey can be categorised under different subjects as follows:-

Sex and age structure

The sex of the elephant was recorded in a total of 181 animals and of these 99 were females and 82 were males. The age of each animal was also recorded and categorised under ten year age groups. The results are are given in Table.

From Table 1, it can be seen that the largest number for males were in the 21 - 30 year age group and the 31 - 40 year age group, with 17 animals in each. Analysis of this data indicates that 41.4% of the total number of male captive elephants recorded in this survey are between the age of 21 and 40 years. In the case of females, the largest numbers were recorded in the 31 - 40 year age group and 41 - 50 year age group, with 26 animals coming within each group. Accordingly it can be calculated that 52.5% of the total number of 99 females recorded are between the age of 31 and 50 years. However if the total number of 181 animals on which age data were obtained is taken regardless of sex, it is seen that the largest number of 43 animals are within the 31 - 40 year age group and constitutes 23.7% of the total. Therefore it can be inferred that while most captive elephants in Sri Lanka are between the age of 21 and 50 years at present the majority age group for males is ten years less than that for females.

Table 1 Age groups of elephants

Age Group	Males	Females	Total
1 - 10 years	14	7	21
11 - 20 years	11	13	24
21 - 30 years	17	16	33
31 - 40 years	17	26	43
41 - 50 years	13	26	39
51 - 60 years	8	7	15
61 - 70 years	2	3	5
71 - 80 years	0	1	1
Total	82	99	181

The maximum age recorded in this survey was of a 72 year old female while only 11.6% of the total number of animals recorded are above the age of 50 years. The same percentage was recorded for the animals bellow 11 years of age and the minimum age recorded was of a 2 year old male. Therefore it is seen that a large percentage of captive elephants of both sexes in Sri Lanka are in the breeding, adult age group at present. However very few of these animals are ever used for the purpose of captive breeding, possibly due to the fact that this has not been a traditional practice in this country.

Physical features

The data collectd were analysed with regard to certain external physical features. This included analysis of the relatuionship between sex, age and height of the Sri Lanka elephant. Other pysical features such as the shape, size, tearing and depigmentation patterns of the ears as well as the length, shape and hair pattern of the tail were analysed in detail for the purpose of finding indivdual indentification criteria for possible application in later research on elephants in the wild. Tabulttion and analysis of data yielded the following results.

Correlation betwwn age, sex and height

Age, height and sex were recorded in 173 elephants in the course of the survey and this data was subjected to compartive analysis to determine if there was any correlation between the three factors in *Elephas maximus*. For the pupose of analysis the data were first categorised under five year age groups, while the age was listed under 1 foot (12 inch) categories. The number of males and females in each height-category for each age group was counted separately as seen in Table 2.

Table 2: Height (ft) of elephants

Age group (in years)	Height category in feet <= 6.0 M	F	6.1-7.0 M	F	7.1-8.0 M	F	8.1-9.0 M	F	9.1-10.0 M	F	=>10.1 M	F
0 - 5	5	-	-	-	-	-	-	-	-	-	-	-
6 - 10	4	1	2	2	1	-	-	-	-	-	-	-
11 - 15	-	1	3	1	1	1	-	-	-	-	-	-
16 - 20	-	-	5	2	2	7	-	1	-	-	-	-
21 - 25	-	-	-	3	8	4	6	1	-	-	-	-
26 - 30	-	-	-	1	1	5	2	2	-	-	-	-
31 - 35	-	1	-	3	6	5	1	1	2	1	-	-
36 - 40	-	-	-	1	1	10	4	3	3	1	-	-
41 - 45	-	-	-	3	2	11	2	6	1	-	-	-
46 - 50	-	-	-	-	1	5	2	1	4	-	-	-
51 - 55	-	-	-	1	1	3	-	2	4	-	1	-
56 - 60	-	-	-	-	-	1	-	-	2	-	-	-
61 - 65	-	-	-	-	-	2	1	-	-	-	1	-
66 - 70	-	-	-	-	-	1	-	-	-	-	-	-
71 - 75	-	-	-	1	-	-	-	-	-	-	-	-
Total M/F	9	3	10	18	24	55	18	17	16	2	2	0
Total for Height groups	12		28		79		35		18		2	

Subsequently the same data were analysed to ascertain the maximum recorded height, minimum recorded height, average height, and the height category to which the majority of animals in each five year age group belongs. This was worked out separately for males and females as given in Table 3.

the age of 40 but above this age males continue to grow taller while the growth rate in females decreases or stops completely. It can also be seen that the maximum recorded height in each age group above the age of 20 is always more in males than in females while the minimum recorded height for each age group over 20

Table 3: Height categories in elephants

Age Group (in Years)	Maximum Height		Minimum Height		Average Height		Majority Height Category	
	M	F	M	F	M	F	M	F
0 - 5	4.4	-	3.6	-	4.0	-	<6.0	-
6 - 10	7.6	6.6	6.0	5.6	6.4	6.2	<=6.0	6.1-7.0
11 - 15	8.0	8.0	6.6	5.10	7.0	6.5	6.1-7.0	<6.0-8.0
16 - 20	8.0	8.0	6.6	7.0	7.0	7.6	6.1-7.0	7.1-8.0
21 - 25	9.0	8.6	7.6	6.6	8.1	7.5	7.1-8.0	7.1-8.0
26 - 30	9.0	8.6	8.0	6.6	8.5	7.8	8.1-9.0	7.1-8.0
31 - 35	10.0	9.6	7.6	6.0	8.3	7.6	7.1-8.0	7.1-8.0
36 - 40	10.0	9.6	8.6	7.0	9.0	8.1	8.1-9.0	7.1-8.0
41 - 45	9.3	9.0	7.6	7.0	8.3	7.9	7.1-8.0	7.1-9.0
46 - 50	10.0	9.0	7.6	7.6	9.0	7.9	9.1-10.0	7.1-8.0
51 - 55	10.11	9.0	7.6	7.0	9.4	8.0	9.1-10.0	7.1-8.0
56 - 60	9.6	8.0	9.6	8.0	9.6	-	9.1-10.0	7.1-8.0
61 - 65	10.0	8.0	8.6	7.6	-	-	8.1->10.1	7.1-8.0
66 - 70	-	7.2	-	7.2	-	-	-	7.1-8.0
71 - 75	6.6	-	6.6	-	-	-		6.1-7.0

Close study of these figures indicates that in general the height of the Sri Lankan elephant is an extremely variable factor when compared with age. However some clear differences were seen between the sexes with regard to height. For instance the majority height category for females in all age groups between the age of 16 and the age of 70 remained at 7.1 - 8.0, with more than 50% of all animals in each age group on which data were obtained coming under this height category. In males on the other hand the majority height category was seen to be generally more variable above the age of 25 while above the age of 45 the majority height category was found to be 9.1 - 10.0. The data also clearly indicates that increase in height is roughly equal in both males and females up to

is generally lower in females than in males. The only exception to this pattern being that the minimum recorded height in both males and females of the 46 - 50 year age group is equal. Likewise the average height is more for males than for females in all age groups for which sufficient data on both sexes are available to calculate an average. The maximum height recorded for male elephants regardless of age was 10.11 feet at the withers (this being an exceptionally tall animal) while for females it was 9.6 feet. Curiously in the 16 - 20 year age group while the maximum recorded height was equal, the minimum height, average height and majority height categories were all found to be higher in females and lower in males. However in the age groups below the age of 16, once

more the pattern of males being generally taller than females could be seen as in the groups above the age of 20. Unfortunately as there were no females in the age group of 0 - 5 years and no males recorded in the two age groups above 65 years making age/sex comparisons for these three groups was not possible.

Accordingly in can be concluded that although height is a highly variable factor in *Elephas maximus* occurring in Sri Lanka, differences do exist between the sexes in relation to age and growth rate. However the above data analysis shows that height alone is not a factor that can be used do differentiate the sex or age of elephants in the field due to the highly variable nature of this parameter. This is clearly seen when examining the data from examples such as a 35 year old female which is 9.6 feet at the withers while a 70 year old female has a height of only 7.2 feet at the withers. Likewise in males a 35 year old animals was recorded to have a height of 10.0 feet, a 55 year old male had a height of 7.6 feet and an exceptionally tall 52 year old male had a height of 10.11 feet at the withers. Therefore height is not a parameter with which age or sex can be determined in the Sri Lankan elephant. At the same time further investigation beyond this preliminary study with additional data on the age, sex, growth rate relationship could bring about interesting results.

Ears

Detailed information on the external ear pinna which was found to be extremely variable was collected on 170 of the elephants in the survey. Using the data thus collected together with the identification photographs of each animal analysis was done with regard to ear shapd, ear size, ear fold, tearing on ears and depigmentaion on ears.

Ear shape - With regard to shape, the ears of 170 elephants on which data were available were categorised under 3 main shapes as can be seen in Fig. A and the results were seen to be as follows;

1. Short acute angled lobe = 43
2. Elongated acute angled lobe = 46
3. Rounded lobe = 81

Accordingly of the 170 animals sampled 47.6% had ears belonging to the Rounded lobe category indicating that this is the most commonly found ear shape in Sri Lankan elephant. Meanwhile 27.0% of the sampled animals had ears with Elongated acute angled lobes. There was no correlation between the different ear shapes and the sex of the animals.

Ear size - Ear size was examined in proportion to the size of the head (Fig. A) as well as the general size of the animal, under three size categories. Data were collected on 177 animals and the results are as follows;

1. Small = 7
2. Proportionate = 166
3. Large = 4

This data shows that the majority of animals comprising 93.7% of the sample had ears which were proportionate in size when compared with the size of the head. A minority of 3.9% had ears that were small in size while an even smaller number comprising of only 2.2% of the sampled animals had ears that were large in proportion to the size of the head.

Ear fold - A common physical feature of Sri Lankan elephants is the fold or turn over along the top margin of the ear pinna, extending to the top outer edge of the ear. Of the 170 animals sampled with regard to the ear fold only 4 animals were found not to have any folding along the top edge and all four were below the age of 10 years. However the entire sample contained 15 animals in the 1 - 10 year age group and except for the above mentioned 4 animals the other 11 had a certain amount of folding along the upper edge of the ears. On the other hand 137 animals belonging to both sexes and belonging to different age groups had small to medium folding along the top edge of the ears. Extensive folding along the top edge and

outer corner of the ears was recorded in 33 animals of which 25 (75.7%) were found to be above the age of 40 years. It was also noted that out of a total of 8 animals which had extensive folding but were under 40 years of age 7 were males and only 1 was a female. This factor was interesting as the number of females in the sample as a whole outnumbered the number of males.

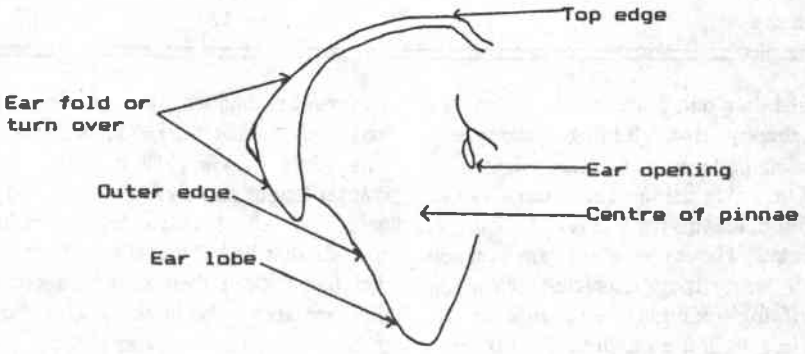
The extent of the ear fold is a commonly used parameter to estimate the age of Asian Elephants but the above stated results of this study did not indicate that this alone is a reliable index to be used in estimating the age of animals. Of the total number of animals in the age group below 11 years of age 73.3% were found to have small to medium top edge folding on the ears indicating that folding is not purely determined by age. Likewise small to medium folding was also evident in many animals of various age groups and both sexes above the age of 10 years. The majority of animals with extensive folding were above the age of 40 years but a minority of 24.2% had extensive folding while their age ranged between 13 years and 35 years. However the results also indicate that the occurrence of extensive folding at a young age seems to be more evident in males than in females. Therefore it may be possible to use the ear fold as a guide in estimating the approximate age of females but this needs further investigation. Although the possibility still remains that the ear fold has some connection to the age of an elephant it is difficult to use the extent of the ear fold alone as a criteria to accurately estimate age in the Sri Lankan elephant.

Ear tearing - Tear marks on the ears were also examined on 170 sampled elephants. 84 animals representing 49.4% of the total number were found to have no tear marks at all, while 63 animals representing 37% of the total had small nicks along the outer edge and 23 animals representing 13.5% of the total had large tear marks along the outer edge of the ears. Most of the largest tears were seen on the top outer edge where the ear folds. One particular animal was seen to have a neat, round hole, about 1.5 inches inward of the outer edge with no tears along the edge itself. Most of the larger tears along the edge were semicircular or V-shaped while the tears on the top corner in some animals looked ragged with entire parts of the flap missing.

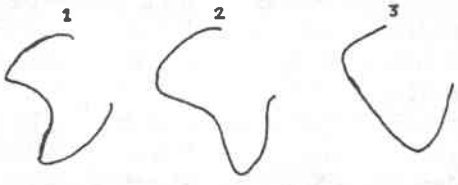
The above data indicates that a large number (49.4% of the sample) of domesticated elephants in Sri Lanka have no tearing on their ears. However tear marks on the ears are very common in wild elephants and therefore this could be a direct result of the vegetation in the natural habitat inhabited by the elephant in Sri Lanka. Accordingly domesticated elephants captured from the wild at an early age and those born in captivity have no tears on their external ears.

Depigmentation on ears - Depigmentation patches and the patterns created by them were found to be extremely varied among individual elephants. These numerous variations can be used for individual identification of the elephants as the pattern of depigmentation on the ears of each animal was almost unique, differing even slightly from all others. Only very young animals were found to have no depigmentation at all on any part of the ears. A large number of animals of both sexes had depigmentation to some extent along the outer edge and on the lobe of the ears. Most of the animals with extensive depigmentation also had it along the outer edge and on the lobe while only a few had extensive depigmentation along the top edge and in the centre of the ear pinna. Even in young animals where depigmentation patches were just beginning to appear they were on the lobe or along the outer edge of the ear. The extent of depigmentation of different areas of the ear pinna was examined in 170 animals and the results give some idea of the possible variations (Table. 4).

FIG. A - Parts of the External Ear Pinnae

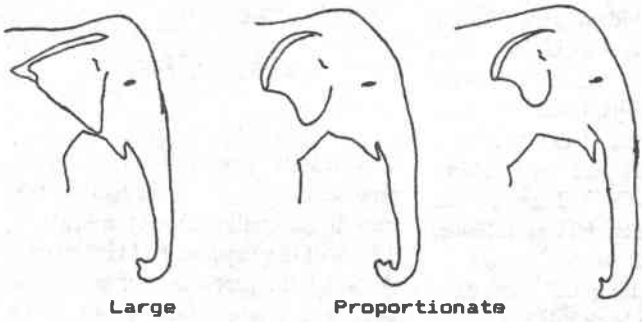


Ear Shape Variations



1. Short acute angled lobe
2. Elongated acute angled lobe
3. Rounded lobe

Ear Size Variations



Large Proportionate Small

Table 4: Ear charateristics in elephants

	Outer edge	Lobe	Top edge	Center
None	31	21	73	105
Low	60	51	85	60
Extensive	79	78	12	05

The combined data on all the ear characteristics including shape, size, folding, tears and depigmentation patterns and extent when analysed show that external ear characteristics can be very useful in identifying individual elephants in Sri Lanka. However there are certain limitations in using these characteristics along when identifying individual elephants in the wild unlike in a domestic situation. For instance, dust or mud could obscure characteristics such as depigmentation while the shape and extent of tearing cold change with time and the extent of ear folding too could change with time. Only the size and shape of the ears would remain constant in adult elephants. Therefore although ear characteristics can be used for individual identification of the Sri Lanka elephant they should be used in combination with other physical features such as height, sex, trunk, head and tail.

Tail

The possibility of using the tail of the Sri Lankan elephant for individual identification was looked into by analysing data collected on the tail length of 175 animals. In addition to this, with the help of photographs taken of each animal the tail shape and hair at the end were also examined in 163 animals and the resulting data are given in Table 5. The tail length was divided into 3 categories (Fig. B1) as follows.

1. Long - almost touching the ground.
2. Normal - reaching the hock joint of leg or a little below.
3. Short - ending above the hock joint of leg.

The results obtained by examining data on tail length show that 8.5% (15 animals) had long tails while 67.4% (118 animals) had tails of normal length and 24% (42 animals) had short tails. The short tail category includes both animals that had short tails by nature and those that had broken their tails at some stage and now are above the hock joint of the hind leg. It is not known however, if these percentages calculated on the basis of captive elephants would be relevant with regard to wild elephants as for instance the exact reasons for tails being broken are not known. A possible reason for a large number of male, wild elephants as opposed to females having broken tails could be a result of fighting among bull elephants in their natural habitat. Therefore the percentage of wild elephants with short tails may be higher than in domesticated elephants.

Tail shape was looked at under two categories as illustrated in Fig. B2. and the categories are as follow;

1. Straight
2. Kinked or coiled

The results obtain show that 142 animals representing 87.1% of the total number sampled had straight tails while 21 animals representing 12.8% of the sampled had kinked or coiled tails. Although the percentage of animals with kinked tails was low it could prove to be a useful individual identification characteristic in the field as each animal with a kinked or coiled tail was distinctive from all others.

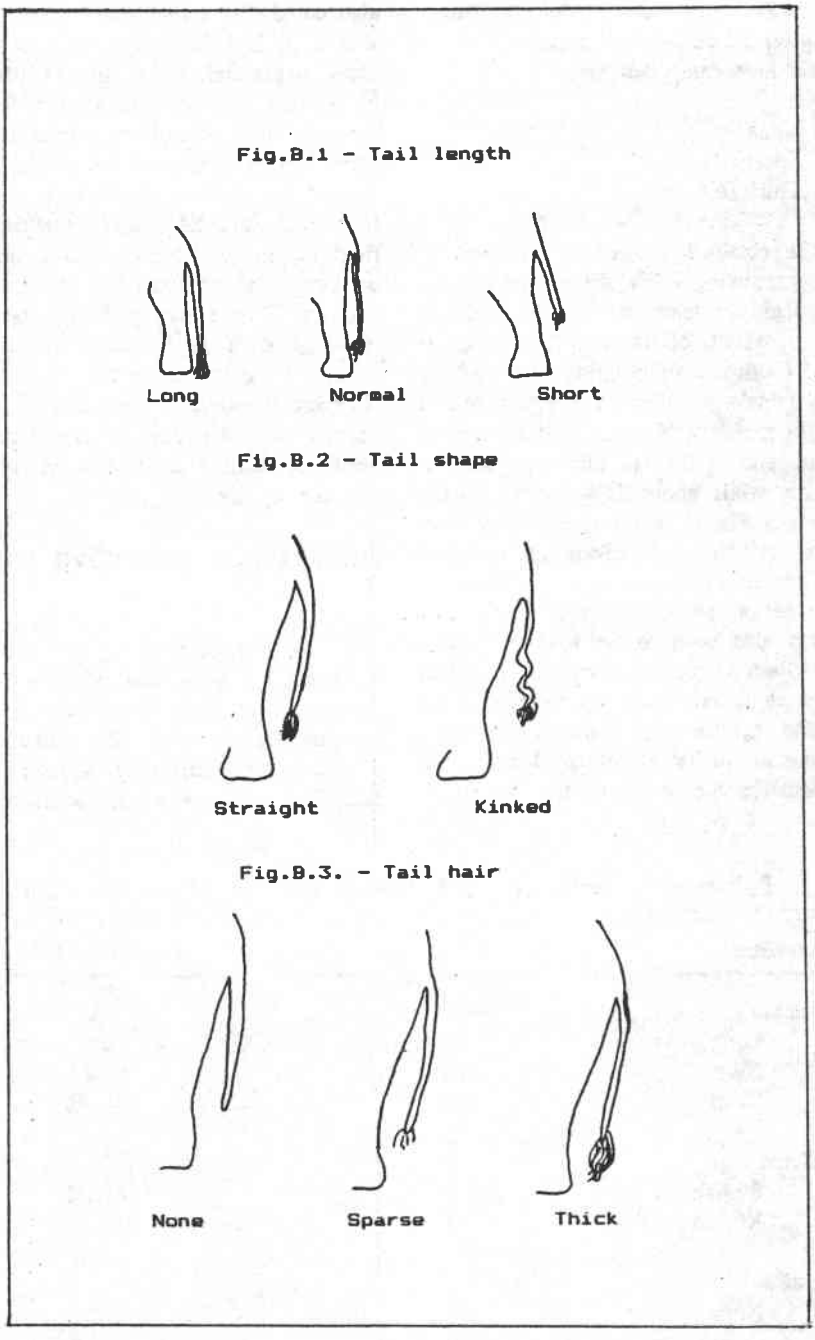


Fig. B - Variations in the elephant tail

The hair that forms a brush at the end / tip of the tail was categorised under 3 groups depending on the quantity as illustrated in Fig. B3. These three categories are;

1. None
2. Sparse
3. Thick / Bushy

The results obtained accordingly are that 12 animals representing 7.3% of the total number sampled had no hair at all, 67 animals representing 41.1% of the sample had sparse hair and 84 animals representing 51.5% of the total had a thick growth of hair at the end of the tail. The majority of animals (75%) with no hair at the end of the tail also had short or broken tails while about 25% had tails of a normal length. Therefore this inverse correlation between no tail hair and broken tails indicates that this characteristic would be dependent to a large extent on the percentage of broken tails which was also seen to be low in captive elephants. Both sparse and thick hair at end of the tail were found in a high percentage of animals and therefore this characteristic would not be very useful for individual identification of elephants in the wild. In the course of collecting and analysing data on tails it was also noted that a few animals had hair which was white in colour in contrast to the normal black at the end of the tail. As this seems to be a rare characteristic in the Sri Lankan elephant it can possibly be helpful in individual identification of animals in the wild, if it occurs in wild elephants. In view of the above it can be said that the tail is only a marginally useful field identification characteristic and can be used only in combination with other physical features. This is mainly due to the low level of variation in the length, shape and quantity of hair at the end of the tail in the Sri Lankan elephant. However to determine the usefulness of tail characteristics in identification it is necessary to have more data on tail beraking, tail hair etc. in wild elephants.

Aggression in captive elephants

With regard to aggression in captive elephants data were recorded for a total of 181 animals of which 82 were males and 99 were females. Of the total 181 animals 58 were recorded to be general ly aggressive while 24 had killed one or more persons. However a clear

Table 5: Length, shape & hair at the end of elephant tail

Characteristic	No. of Animals	Percentage (%)
Tail Length :		
Long	15	8.5%
Normal	118	67.4%
Short	42	24.0%
Tail Shape :		
Straight	142	87.1%
Kinked / Coiled	21	12.8%
Tail Hair:		
None	12	7.3%
Sparse	67	41.1%
Thick	84	51.5%

difference between the sexes was evident in the data regarding aggression. It was found that of the 82 males 33 were generally aggressive and 16 of them had killed humans at some stage. Of the 99 females 24 animals were reported to be generally aggressive in their behaviour but only 8 of them had killed people. Statistical analysis of this data indicates that 40.2% of the domesticated male elephants are aggressive while 19.5% become killers at some stage. In contrast to this only 25.2% of domesticated female elephants become aggressive and of these 8% become killers. However if the statistics are examined regardless of sex it shows that in general about 13.2% of all captive elephants in Sri Lanka are potential man killers while 32% are generally aggressive in their behaviour at all times, even if they have not killed people. From the data collected it was also seen that most of the victims have been the elephant mahouts.

Food of domesticated elephants

The data collected in this survey included information on the food given to captive elephants in Sri Lanka and individual food preferences. Analysis of this data shows that in general domesticated elephants in Sri Lanka are fed on a mixed diet of *kithul* logs, *coconut palm* branches and *jak* branches. In addition to this staple diet some that were based in rural areas were given small quantities of other plant material which included *eramudu, bo, pota wel, thimba, nuga* and *budaliya*. The kinds of food given were recorded for a total of 180 elephants. Of these one was still being fed on milk from its mother and did not come under the normal feeding patterns.

All 179 adult animals on which food data were recorded had some percentage of *Kithul* in their regular diet. A total of 122 elephants (68.1%) were fed continuously on a mixed diet of *kithul, coconut* and *jak* branches with not other variations. A further 39 animals (21.7%) were fed only on a mixture of *Kithul* and *coconut* while just 1 animal was found to be fed exclusively on *kithul*. 17 animals (9.4%) out of the total 179 adults had small quantities of the other plant material named above diet in addition to *kithul, coconut* and *jak*. The quantity of these other plants given to these animals depended entirely on availability as they are wild plants found only in small quantities. However, 11 animals were recorded to have *eramudu*, 7 animals had *bo*, 3 animals had *pota wel*, 1 had *Nuga*, 1 had *budaliya* and 1 had *Thimba* in their diet, in small quantities.

The mahouts of the elephants were also questioned as to the individual food preferences of each elephant and the resulting data were recorded and analysed. Preferences were thus recorded on a total of 149 animals while the others had no clear food preferences according to their mahouts. Of the 149 animals which showed a preference for one type of food over another 138 elephants accounting for 92.6% of the total showed a clear preference for *kithul* while only 13 animals (8.7%) showed a preference for *coconut*. Another 5 animals showed an equal liking for bother *kithul* and *coconut* but preferred bother these to other kinds of food such as *jak* branches. There were 3 animals however that preferred a mixed diet of all three kinds at all times and did not appreciate being given any one kind of food. There was also 1 animal which showed a preference for both *Pota wel* and *Eramudu* rather than the normal kinds of food given while 1 animal preferred only *eramudu* and another preferred *budaliya* to all other kinds of food which were offered.

Analysis of all this data on feeding of captive elephants in Sri Lanka makes it clear that all elephants are given *kithul* in some quantity as a part of their normal diet and over 90% of the animals show a clear preference for it over other kinds of food given to them. The other kinds of food that are commonly given to captive elephants are *coconut*, and *jak* branches. The quantities needed for a day vary according

to the size of the animal, sex, age, the work it does etc.

Work done by captive elephants

Data were obtained from the mahouts regarding the work done by 180 of these domesticated, captive elephants. The average number of days in a month that each elephant works was recorded. The data were categorised under four groups according to the number of working days as follows;

1. None - no working day
2. Low - less than 10 days a month
3. Medium - 10 to 15 days a month
4. High - 16 to 22 days a month

The results obtained by analysing the data under the above categories are shown in Table 6.

Of the working elephants 52.7% fell into the medium work category, doing between 10 and 15 days work per month. Only 24 animals (13.3%) worked more than 15 days a month and none exceeded 22 days a month. A further 32 animals (17.7%) worked only a few days includes uprooting trees, dragging, carrying and loading logs at logging camps and saw mills etc. However besides these traditional kinds of work, of recent times captive elephants are being used in the tourist trade at hotels and other resorts. Here the animals give rides to tourist, they can be touched, fed and photographed by tourists for a fee. Compared to the traditional forms of work they have been used for this new source of work is physically easier for the elephants and brings a substantial income for the owners.

Table 6: Work done by captive elephants

Category	No. of Animals	Percentage
None (0 days)	29	16.1%
Low (<10 day)	32	17.7%
Medium (10-15 days)	95	52.7%
High (16-22 days)	24	13.3%

According to the figures given in Table 6 it is seen that 29 elephants constituting 16.1% of the total number on which work data were available did not work at all; of these 19 animals (16.5%) belonged to religious institutions such as temples and therefore did not have to work to earn a living. 5 animals did not work because they were not old enough and therefore not big enough to do the normal heavy work done by captive elephants in Sri Lanka. Of the other 5 animals that did not work, 1 was an Army mascot and only took part in parades, 2 were not able to work at the time of data collection due to ill health, 1 could not work as it was a lactating female still feeding a calf and 1 did not work as its owner did not want it to work.

In addition to all these forms of work most of these elephants also participate in temple festivals and processions ("perahera") but this is done as a part of Sri Lanka's cultural tradition and not to generate income. It is considered an honour for the elephant, the mahout and the owner of the elephant to be able to participate in these religious festivals and these services are provided to the temples free of charge. All captive elephants in the country are trained to take part in these ceremonies. The largest and most prestigious of these ceremonies is the annual Perahera of the Temple of the Tooth Relic which parades the streets of Kandy for 7 consecutive nights. The honour of carrying the casket containing the relic of Lord Buddha goes

to a special tusker which has to have certain distinguishing points according to tradition. This animal is normally owned by the temple and given special care and attention throughout its life.

Names given to captive elephants

A curious observation which was made in the course of this survey on captive elephants in Sri Lanka is that certain names given to elephants by their owners are very popular. For instance names were recorded for a total of 82 male elephants and of these 28 (34.1%) were named *Raja* while there were 2 named *Jayaraja*, 1 named *Indiraja*, 1 named *Wijeraja* and 1 named *Singharaja*. Accordingly 40.2% of the total number of 82 males had "Raja" at least as a part of their name. Likewise in the case of females of a total 99 animals on which names were recorded 40 were named *Menike* (40.4%), 10 were named *Manika* (10.1%) 2 were named *Podimenike* and 1 was named *Kalumenike*. Accordingly of the total number of females where names were recorded 53.5% were called *Menike / Manika* as their name or a part of their name. The exact reasons for the popularity of these particular names is not known but the meaning of the names gives a clue. The name *"Raja"* means King and it is not surprising that it should be thought of as a fitting name for a male elephant. Likewise *"Manike"* or *"Manika"* means Lady in the Sinhala Language and therefore is popularly used for female elephants.

Mahouts

Personal details such as name, address, age and the number of years working as a mahout were recorded for the mahouts as a part of this survey. The analysis of data collected on the age of the mahouts and the number of years engaged in this particular occupation brought forth some very interesting facts regarding this traditional occupation. It was found that the age of these mahouts varied between 16 and 72 years but the majority of them were between the of 20 and 45. However when the present age and the number of years they had been engaged in this occupation were compared for each mahout it was found that the majority of them started working as mahouts at a very early age as can be seen in Table 7.

As indicated in the above figures it was found that 12.6% (22 mahouts) of the total on which data were obtained had started working with domesticated elephants while they were less than 11 years of age while the youngest age at which a mahout was recorded to have started this kind of work was 5 years. Most of these 22 mahouts had started working as helpers to their fathers or uncles who had also been elephant mahouts. In addition to this a further 55.7% (97 mahouts) had started working as mahouts between the age of 11 and 20 years. 49 other mahouts constituting 28.1% had started working with elephants between the age of 21

Table 7: Age at starting work as an elephant mahout

Age Group	No. of Mahouts	Percentage of Total
<11 years	22	12.6%
11 - 20 years	97	55.7%
21 - 30 years	49	28.1%
>30 years	6	3.4%

and 30 years while only a small minority of 6 mahouts (3.4%) had been above 30 years of age when they started.

A large percentage had at first worked as an assistant mahout to their own fathers or some other relation who was the senior mahout. Having gained experience they then started looking after an elephant on their own under the same employer if there were more than one elephant or else they found employment under another elephant owner. It was also observed that there was a very close relationship between mahout and elephant and that the mahouts understood very well the needs and preferences of the elephants they looked after. This was specially obvious in the mahouts who had been engaged in this same occupation from a very early age. Some of them had even been looking after the same elephant throughout their career and treated the animal more as a friend and companion than a mere source of income. Most of the mahouts also stated that they found it a satisfying occupation and would not give it up for any other job. All there data point to the fact that being an elephant mahout is a traditional occupation which goes from father to son in Lanka. It is also an occupation which is strictly limited to males, as there have never been any female mahouts in the recorded history of Sri Lanka.

Conclusions

1. The collection of all required data on 181 captive elephants, their owners and mahouts was achieved through this initial phase of the survey. Accompanying identification photographs were also obtained on all these animals.

2. The data on age and sex structure of these captive elephants brought forth some interesting information and it was possible to build certain hypothesis regarding correlation between factors such as age, sex and height in the Sri Lankan elephant. However additional data and further analysis are needed to test the hypothesis. The general age structure of captive elephants of both sexes in Sri Lanka at the present time was also calculated using their data.

3. The data obtained on the physical features of the elephants when analysed indicate that certain features in the Sri Lankan elephant are highly variable and can be used as individual identification characteristics. However the degree of usefulness of each feature or combination of characteristics discovered through this survey has to be tested by applying the same criteria for the purpose of individual recognition of wild elephants.

4. Analysis of the collected data also made it possible to get a general understanding on aggression and attacks on humans, feeding and food preferences and work done by captive elephants in Sri Lanka.

5. Certain interesting socio-cultural factors connected with elephants in captivity in Sri Lanka were also observed in analysis of this data. These were mainly with regard to the names given to captive elephants, the traditional occupation of being an elephant mahout and the relationship between the mahout and his elephant.

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