

## Management of Captive Asian Elephants in Kozhikamuthi Elephant Camp, Topslip, Anamalai Tiger Reserve, Southern India

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### Introduction

Asian elephants (*Elephas maximus*) have been managed by the Tamil Nadu Forest Department since 1857 in wildlife sanctuaries (Krishnamurthy & Wemmer 1995a, 1995b). Initially they were used for logging and after the ban on logging in 1994 they have been used for providing elephant rides for tourists (Bist *et al.* 2002). The present study was carried out to assess management practices of elephants in Kozhikamuthi Camp, Top Slip, Anamalai Tiger Reserve, Tamil Nadu.

### Methods

The Anamalai Tiger Reserve lies between latitude 10° 25' 01" N and 10° 41' 70" N and longitude 77° 03' 24" E and 77° 05' 67" E, in the state of Tamil Nadu. It is situated in the southern part of the Nilgiri Biosphere Reserve in Anamalai hills. The Anamalai Tiger Reserve is contiguous with three sanctuaries, Parambikulam Wildlife Sanctuary to its east, Eravikulam National Park to its west and Chinnar Wildlife Sanctuary to its south. The Anamalai Tiger Reserve is divided into six ranges and the Kozhikamuthi elephant camp is in the Ulandy range. It is surrounded by moist deciduous forest and teak plantations.

Observations were made on the elephants, diet, management activities, interactions of mahouts and cavadies with elephants and health care. The diet schedule of the elephants was recorded by direct observation and details of the food given by the Forest Department was obtained from the official in-charge of the camp. Generally captive elephants in forest camps are allowed to forage freely for about eight hours a day in the forest.

Direct observations were made on plant species eaten by the free-foraging captive elephants.

The densities of trees and plants species in the forest around the camp were estimated using six transects established perpendicular to the elephant camp. Transects were 1 km in length and point sampling using 10 m square plots were made at 200 m intervals (Sale & Berkmuller 1988). Number of tree species, shrub species, and weed cover within plots were recorded.

Elephants were weighed using a machine commonly used for weighing loaded trucks at Setthumadai, Tamilnadu. Measurements on height, neck girth, leg girth and, tusk length and girth were taken with a measuring tape (Wemmer *et al.* 2006). Mahouts and cavadies were observed on their interaction with elephants and a questionnaire administered to obtain details of experiences.

### Results and discussion

#### Demography

Of 18 elephants in the camp, eight were males aged 24-49 years, six females aged 30-65 years and four male calves aged 3-13 years (Table 1). The 14 adult elephants were captured from different forests of Tamil Nadu and the four calves were born in Kozhikamuthi camp.

In forest camps captive elephants are maintained as a group consisting of different age-sex classes and they foraged together freely. This has resulted in captive females breeding regularly, either being mated by wild or captive males.

**Table 1.** Age structure of the captive elephants at Kozhikamuthi camp.

Age class [years]	# Males	# Females
1-10	2	0
10-20	2	0
20-30	3	0
30-40	2	1
40-50	1	1
50-60	2	3
60-70	0	1
Total	12	6

Over the last 100 years, 260 calves have been born in forest elephant camps in Tamil Nadu (Krishnamurthy *et al.* 2002).

### Diet

The diet schedule and diet components are shown in Table 2. The regular man-made diet consisted of ragi, horse gram, salt and jaggery. Apart from the man-made diet, all captive elephants were given cut fodder during night, composed of *Ficus benghalensis*, *Solanum torvum*, *Bambusa bambus*, *Grewia tiliifolia*, and *Cassia tora*.

The forest had sparse vegetation with slightly undulating terrain. The broad vegetation type was moist deciduous forest with a few teak and sandalwood plantations and bamboo thickets. The density of trees, shrubs and weeds per km<sup>2</sup> was 3271.2 ± 523.7, 1855.7 ± 241.2, and 5944.8 ± 702.8 respectively. The elephants consumed a total of 37 plant species belonging to 19 families from the surrounding natural forest (Table 3).

**Table 2.** Diet of Kozhikamuthi camp elephants.

Elephant category	Ragi [kg]	Horse gram [kg]	Salt [g]	Jaggery [g]
Juvenile (1-5 years)	7	2	150	150
Subadult (5-15 years)	10	2	200	200
Adult male (>15 years)	18	5	200	200
Adult female (>15 years)	16	4	200	200
Aged female (>50 years)	17	4	200	200

**Table 3.** List of 37 food species found in Kozhikamuthi camp surrounding natural forest.

Common name	Botanical name	Family
Alamaram	<i>Ficus benghalensis</i>	Moraceae
Ambazham	<i>Spondias mangifera</i>	Anacardiaceae
Annakkarai	<i>Lanneacora mandelica</i>	Anacardiaceae
Arasu	<i>Ficus religiosa</i>	Moraceae
Atthi	<i>Ficus racemosa</i>	Moraceae
Cheeni	<i>Tetrameles nudiflora</i>	Datisceae
Ichi	<i>Ficus retusa</i>	Moraceae
Kadalaimaram	<i>Streblus taxoides</i>	Moraceae
Kalvalai	<i>Canna indica</i>	Cannaceae
Karumaruthu	<i>Terminalia crenulata</i>	Combretaceae
Kattukoovai	<i>Curcuma angustifolia</i>	Zingiberaceae
Kodaipalai	<i>Ervtania heyeana</i>	Apocynaceae
Koonthapanai	<i>Caryota urens</i>	Palmae
Koraipul	<i>Setaria pallidifusca</i>	Gramineae
Moongil	<i>Bambusa bambus</i>	Poaceae
Naval	<i>Syzygium cumini</i>	Myrtaceae
Odai	<i>Ochlandra travancorica</i>	Gramineae
Paeatthi	<i>Ficus hispida</i>	Moraceae
Paruvamaram	<i>Streblus asper</i>	Moraceae
Pillamaruthu	<i>Terminalia paniculata</i>	Combretaceae
Pirambu	<i>Calamus rotang</i>	Arecaceae
Ponichi	<i>Ficus benjamina</i>	Moraceae
Poovatthi	<i>Schleiche raoleosa</i>	Spindaceae
Shela	<i>Ficus tsjahela</i>	Moraceae
Thadasu	<i>Grewia tiliifolia</i>	Tiliaceae
Thekku	<i>Tectona grandis</i>	Verbanaceae
Thottachiningi	<i>Mimosa pudica</i>	Mimosoideae
Thovarai	<i>Wendlandia notonianam</i>	Rubiaceae
Vagai	<i>Albizia lebeck</i>	Mimosoideae
Valampurii-dampuri	<i>Helicte resisora</i>	Sterculiaceae
Vatakkanni	<i>Macaranga roxburghii</i>	Euphorbiaceae
Vengai	<i>Pterocarpus marsupium</i>	Leguminosae
Venthekku	<i>Lagerstromia microcarpa</i>	Lythraceae
Kanampullu	<i>Cymbopogon martini</i>	Poaceae
Kodipullu	<i>Cymbopogon flexuosus</i>	Poaceae
Nanalpullu	<i>Saccharum spontaneum</i>	Poaceae
Thailapullu	<i>Cynodon dactylon</i>	Poaceae

Elephants defecated an average of 9 to 13 times a day. Bolus size ranged from 33 to 39 cm.

### Weight and morphometry

All the elephants were in good condition (Fig. 1). The weight of adult males was 3853.7 ± 361.2 kg, adult females 3326.0 ± 74.8 kg and calves



**Figure 1.** Camp elephants waiting for their food.

1292.5 ± 215.3 kg. Vanitha (2007) observed body weights of males and females to be up to 3890 kg among temple elephants and up to 2199 kg among elephants with private owners. The weight of camp elephants suggests that their nutritional status was similar to temple elephants and better than elephants of private owners. Morphometric measurements of elephants are given in Table 4 and tusk measurements of eight adult males and four male calves are given in Table 5.

### Management

In Kozhikamuthi only one elephant had a bell tied round its neck. In Mudumalai elephant camp all elephants had a bell (Kinyoun 1994). As using elephants in timber operations was banned, the elephants in Kozhikamuthi were only used for elephant rides and Kumkie operations. Kumkie operations consisted of driving out wild elephants that stray into fringe villages, capture of wild elephants for captivity and radio collaring of wild elephants. The eight males were engaged in both activities while the females were used only for elephant rides. The calves were not engaged in any work.

**Table 4.** Measurements of the captive elephants at Kozhikamuthi camp.

Measurement	Adult male	Adult female	Juvenile
Height [m]	2.72 ± 0.19	2.5 ± 0.07	1.84 ± 0.34
Breast girth [m]	3.87 ± 0.17	3.7 ± 0.06	2.63 ± 0.51
Neck girth [m]	2.56 ± 0.25	2.3 ± 0.04	1.57 ± 0.39
Leg girth [m]	1.39 ± 0.06	1.3 ± 0.02	0.95 ± 0.17
Weight [kg]	3853.7 ± 361.2	3326.0 ± 74.8	1292.5 ± 215.3

**Table 5.** Tusk details of the captive elephants at Kozhikamuthi camp.

Tusk details		Adults	Calves
Right	Length	0.91 ± 0.03	0.3 ± 0.05
	Mid girth	0.32 ± 0.03	0.1 ± 0.07
Left	Length	0.87 ± 0.08	0.3 ± 0.23
	Mid girth	0.33 ± 0.03	0.1 ± 0.07

### Mahouts and cavadies

A cavady is the assistant of a mahout who takes care of the elephant in the mahout's absence. Cavadies generally do some basic work like feeding, bathing, cleaning the tethering spots and are not allowed to handle elephants when in musth. In Kozhikamuthi elephant camp, the mahouts and cavadies belonged to Malasar, Malamalasar and Kadar tribes. The cavadies assisted the respective mahouts in all regular activities except during musth and illness of elephants. The ages of mahouts ranged from 29 to 58 whereas the cavadies were younger than the mahouts and are usually trainees.

Mahouts spent 2 to 10 hours per day with elephants, depending upon requirement. Mahouts fed the elephants and bathed them twice a day. Tethering places were cleaned by the mahouts.

As all elephants were trained much earlier and were in the camp for many years, no rewards were provided (special fruits and coconut) for obedience. Almost all mahouts punished their elephants for mistakes made on average of 2 to 5 times in a day with the exception of one mahout who never punished his elephant. No mahouts were attacked by the elephants during this study. However, one mahout was attacked twice by an elephant two years ago. During the study all mahouts fed and bathed the elephants twice a day.

Spoken commands were mostly multilingual and consisted of a combination of regional languages of Hindi, Tamil, Kannada and Malayalam. Frequently used commands were for saluting, sitting and lying down, kneeling down, trumpeting, picking up something, handling something, going forward, going backward and halting.

### *Musth*

During the study period three elephants (Kapil, Venkatesh, Ram) experienced musth. The musth elephants were observed in the daytime for 15 days. All musth elephants were tied up and the tethering place was kept clean. Elephants in musth spent 46% of their time on feeding 26% sleeping, 10% resting, 7% bathing, 6% on social interaction with other elephants and 5% in stereotypic behaviour.

### *Health*

Health care of captive elephants in Kozhikamuthi was well managed by a permanent medical practitioner. Good sanitation of the tethering place was maintained by washing it twice a day. The elephants' health status was checked every two months. Traditional methods of treatment were used for diarrhoea and delivery of babies. Mahouts fed individuals with extracts of herbs to treat diarrhoea. Weights of the animals were taken and de-worming done as indicated. De-worming was performed once in two months by the veterinarian with prescribed medicines given along with food.

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