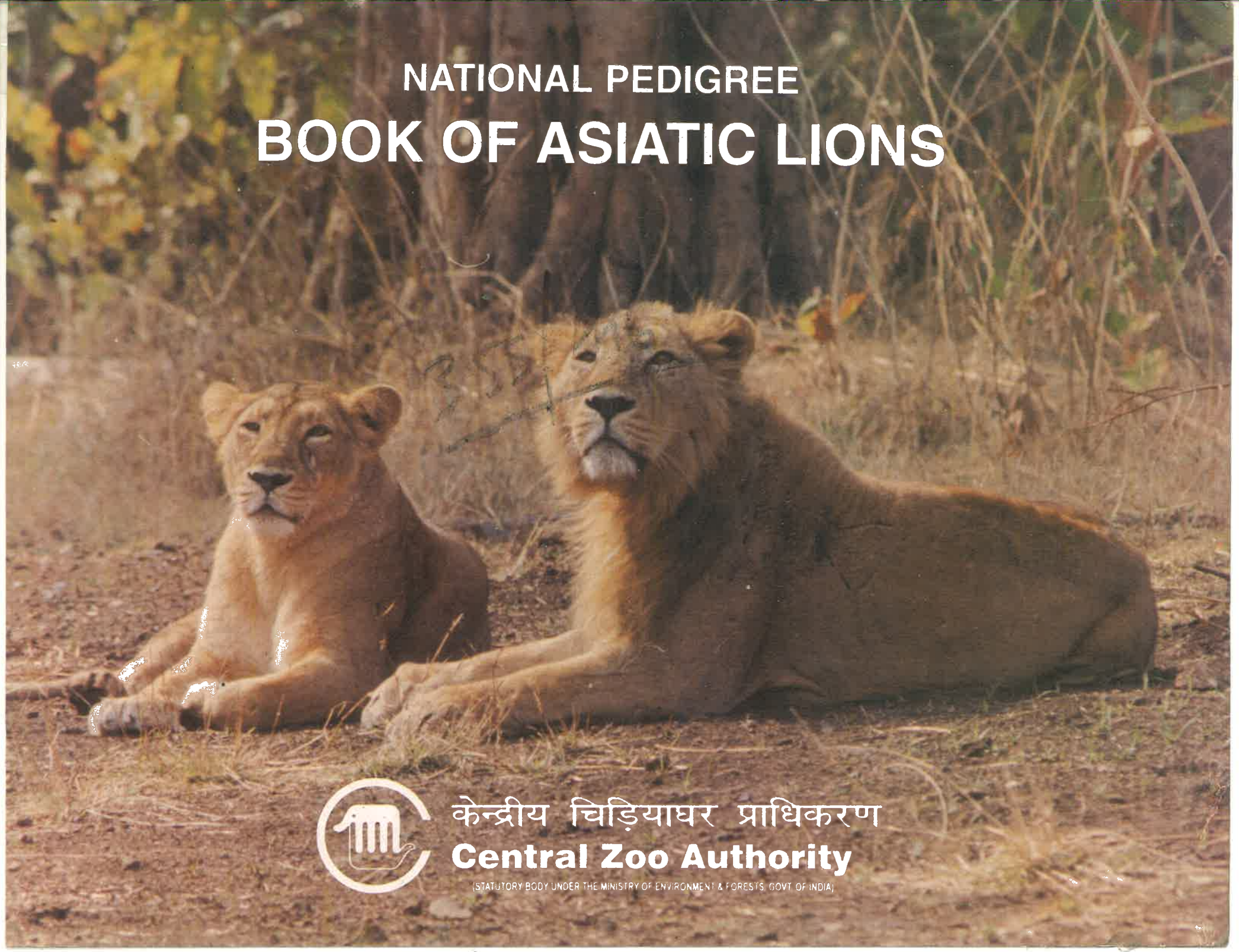
NATIONAL PEDIGREE
BOOK OF ASIATIC LIONS



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Central Zoo Authority

(STATUTORY BODY UNDER THE MINISTRY OF ENVIRONMENT & FORESTS, GOVT OF INDIA)

355/mb

NATIONAL PEDIGREE
BOOK OF ASIATIC LIONS
(Panthera leo persica)

CONTENTS

PREFACE

Asiatic lion is one of the highly endangered wild animals of India. It used to range over most of north India, except in the easternmost parts, and as far south as the Narmada River. The animal used to be very common till around the middle of the nineteenth century. Today its distribution is restricted to the Gir forest in Gujarat. The Asiatic lion has a scantier mane than the African, but curiously enough in combination with this character a fuller coat, a longer tassel of hair at the end of its tail, a more pronounced tuft of hair at the elbow joint, and fuller fringe of hairs on its belly. The average length of the animal is around nine feet. The Gir forest lying in the Junagadh District, the only natural home of this charismatic species, covers approximately 1400 sq. km. The vegetation is composed mainly of stunted teak trees, Palas, Jambal and Ber and patches of small bamboo, with undergrowth of thorny bushes and shrubs. The animal prefers to rest in shade of trees during the day and goes forth in quest of prey at dusk. There appears to be no particular breeding season. In Gir many lions mate between October and November and the young are born between January and February. The period of gestation is about 116 days. The male stays with the family and helps defend the young and later hunt for them. Young are produced at intervals of at-least eighteen months to two years. A lioness may have her first litter when she is two and half to three years of age. The ordinary litter numbers two, but may contain upto as many as five.

It is a highly endangered species requiring both in-situ and ex-situ conservation interventions. As part of the in-situ conservation, efforts are being made to translocate a part of the population from Gir forest to Kuno-Palpur in Madhya Pradesh. Ex-situ conservation of the species through a planned breeding program in zoos forms an integral part of the overall conservation strategy of the species. The compilation of this pedigree book is part of this ex-situ conservation effort. The book collates information from various zoos as on March 1998 and is second in the series published by the Central Zoo Authority. The basic data collection was done by the Zoo Officer, Sakkarbaug Zoo, Junagarh. Dr. Anupam Srivastav (Consultant) and Mr. Bipul Chakraborty (Scientist) have done the analysis of the data. It is hoped that the pedigree book would be made use of by managers of various zoos participating in the planned breeding program of this species.

BASIC DATA SHEET

1.	Number of animals (in Indian Zoos)	83
2.	Sex ratio	24 : 59
3.	Number of zoos exhibiting Asiatic Lions	16
4.	No. of Asiatic Lions of wild origin exhibited in Indian zoos	12 (5 : 7)
5.	No. of Captive born animals in productive age group (4 years–15 years)	55 (11 : 44)
6.	Age class in which maximum mortality has been recorded	0–1 month

DEMOGRAPHIC ANALYSIS

LIFE TABLE

A major influence on population size is mortality. It can be expressed either as the probability of dying or as a death rate. The probability of dying is the number that died during a given time interval divided by the number alive at the beginning of the period. The complement of mortality rate is the probability of living, the number of survivors divided by the number alive at the beginning of the period. As the number of survivors is more important to the population than the number dying, mortality is better expressed in terms of survival or in terms of life expectancy.

A clear and systematic picture of mortality and survival is best provided by a **life table**. The life table consists of a series of columns, each of which describes an aspect of mortality statistics for members of a population according to age. The column includes :

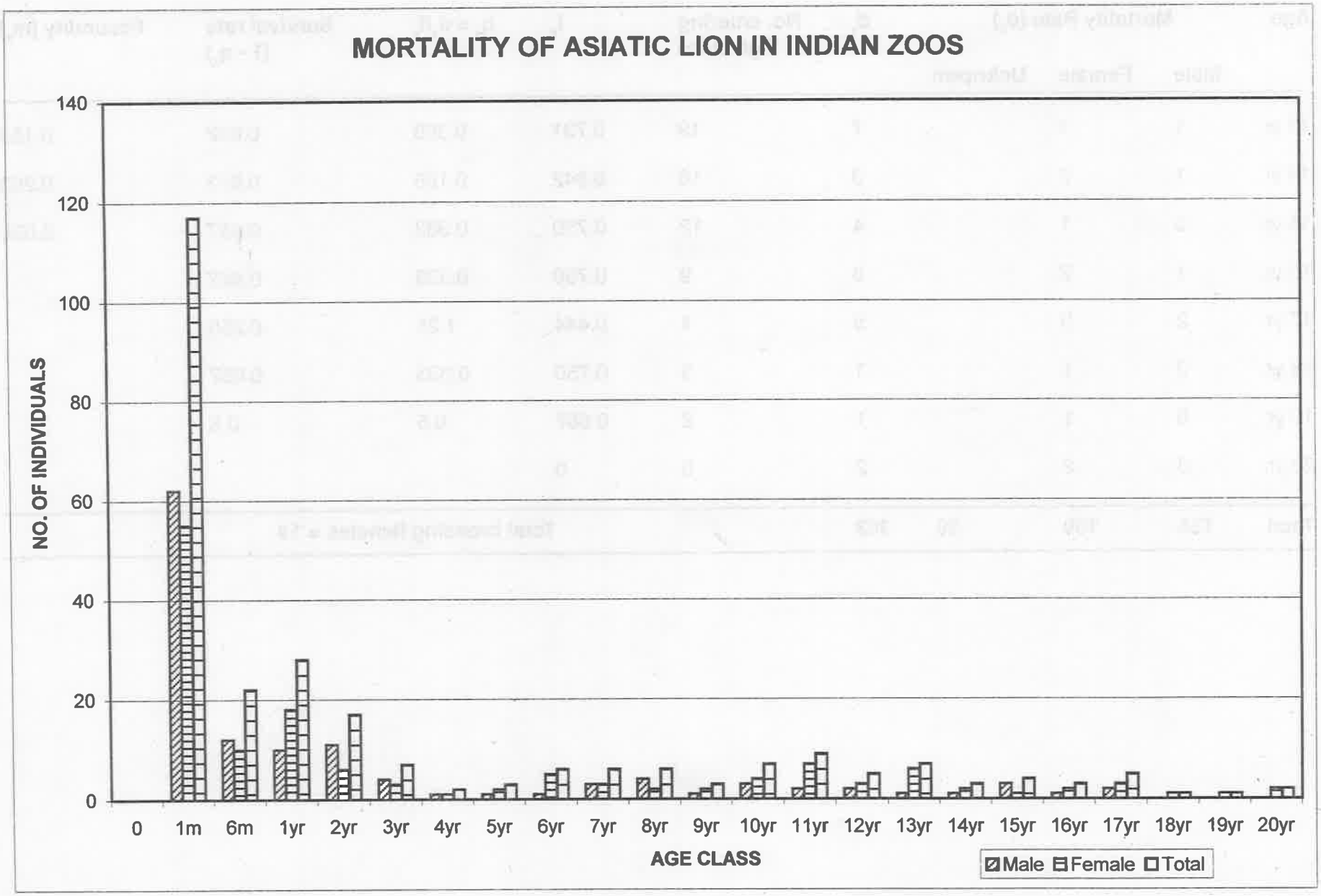
* x the units of age.
* l_x is the number of individuals surviving after regular time intervals.
* d_x is the number dying during successive time intervals.
* q_x is the mortality rate during successive time intervals.
* e_x is the life expectancy at the end of each time period.
* m_x is the age specific natality.

The Life Table for Asiatic Lion in Indian Zoos is presented in the following pages.

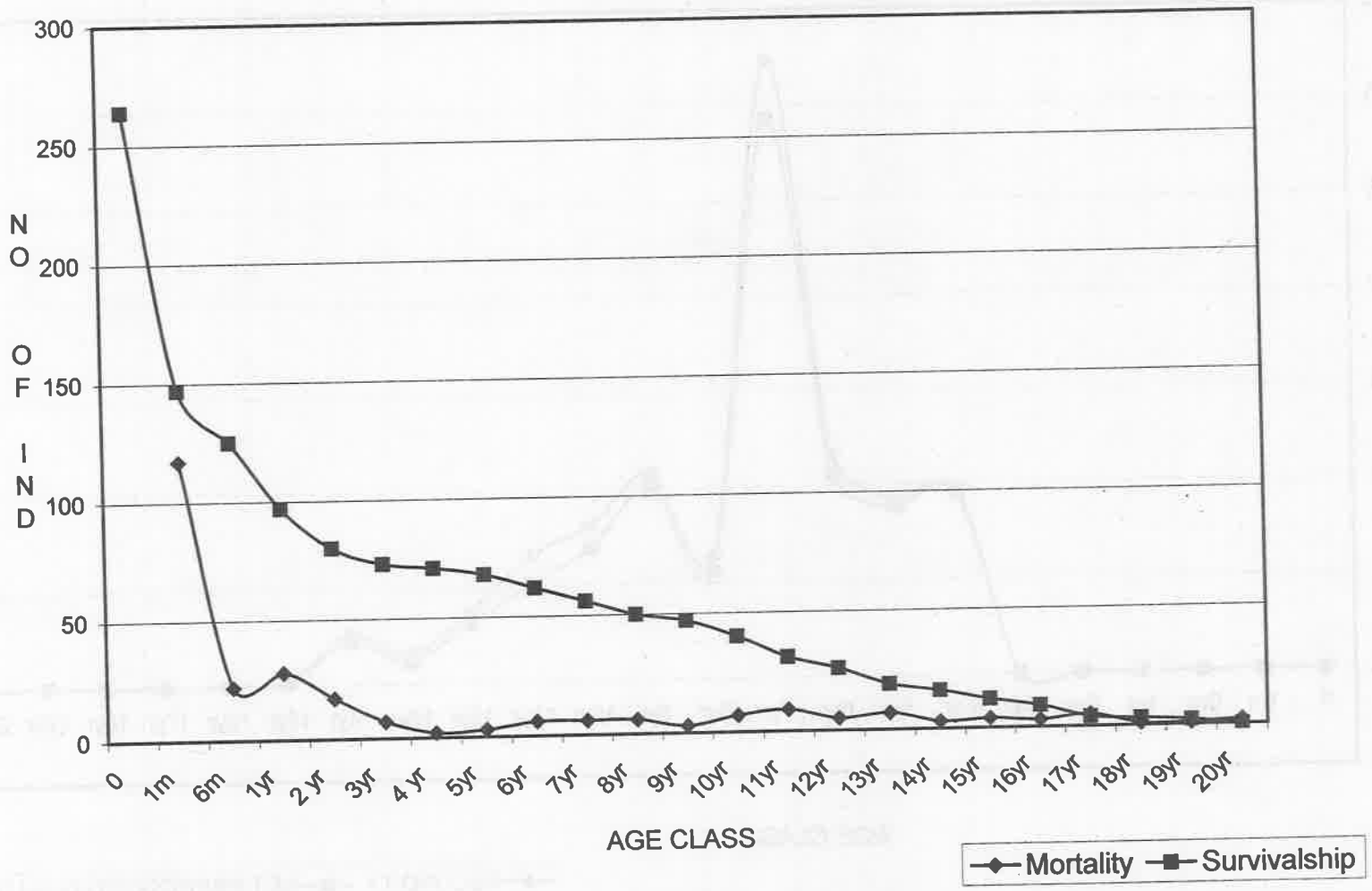
LIFE TABLE OF ASIATIC LION IN INDIAN ZOOS

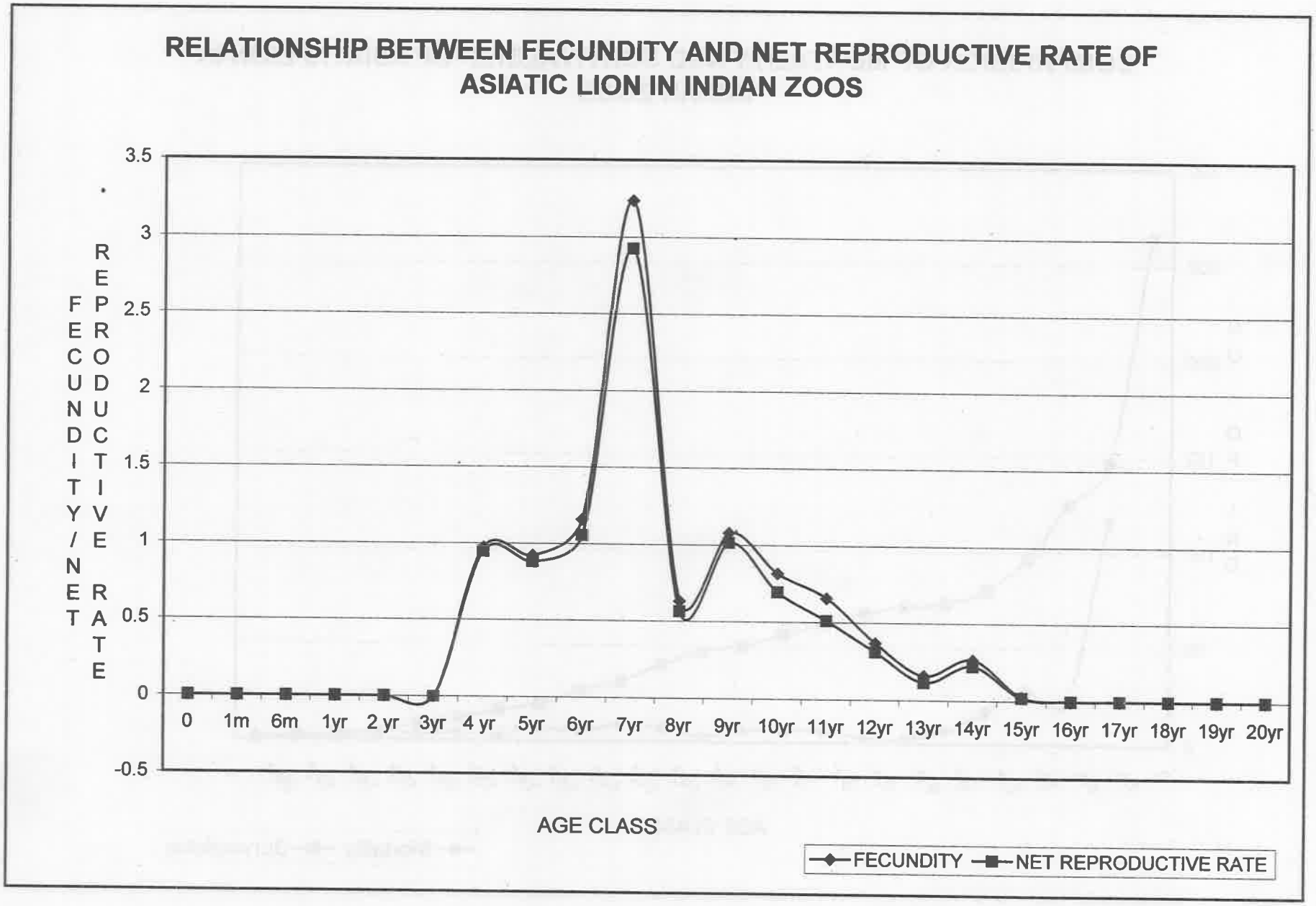
Age	Mortality Rate (d_x)			d_x	No. entering Age class	l_x	$q_x = d_x/l_x$	Survival rate $(1 - q_x)$	Fecundity (m_x)
	Male	Female	Unknown						
0					303				
1 m	62	55	39	156	147	0.485	1.061	-0.061	
6 m	12	10		22	125	0.850	0.176	0.824	
1 yr.	10	18		28	97	0.776	0.289	0.711	
2 yr.	11	6		17	80	0.825	0.213	0.788	
3 yr.	4	3		7	73	0.913	0.096	0.904	
4 yr.	1	1		2	71	0.973	0.028	0.972	0.974
5 yr.	1	2		3	68	0.958	0.044	0.956	0.921
6 yr.	1	5		6	62	0.912	0.097	0.903	1.158
7 yr.	3	3		6	56	0.903	0.107	0.893	3.237
8 yr.	4	2		6	50	0.893	0.120	0.880	0.632
9 yr.	1	2		3	47	0.940	0.064	0.936	1.079
10 yr.	3	4		7	40	0.851	0.175	0.825	0.818
11 yr.	2	7		9	31	0.775	0.290	0.710	0.658
12 yr.	2	3		5	26	0.839	0.192	0.808	0.368

Age	Mortality Rate (d_x)			d_x	No. entering Age class	l_x	$q_x = d_x/l_x$	Survival rate ($1 - q_x$)	Fecundity (m_x)
	Male	Female	Unknown						
13 yr.	1	1		7	19	0.731	0.368	0.632	0.158
14 yr.	1	2		3	16	0.842	0.188	0.813	0.263
15 yr.	3	1		4	12	0.750	0.333	0.667	0.026
16 yr.	1	2		3	9	0.750	0.333	0.667	
17 yr.	2	3		5	4	0.444	1.25	-0.250	
18 yr.	0	1		1	3	0.750	0.333	0.667	
19 yr.	0	1		1	2	0.667	0.5	0.5	
20 yr.	0	2		2	0	0			
Total	**125**	**139**	**39**	**303**			**Total breeding females = 18**		


MORTALITY OF ASIATIC LION IN INDIAN ZOOS
NO. OF INDIVIDUALS
140
120
100
80
60
40
20
0
0
1m
6m
1yr
2yr
3yr
4yr
5yr
6yr
7yr
8yr
9yr
10yr
11yr
12yr
13yr
14yr
15yr
16yr
17yr
18yr
19yr
20yr
AGE CLASS
Male
Female
Total

COMPARISION OF MORTALITY AND SURVIVALSHIP OF ASIATIC LION IN INDIAN ZOOS




RELATIONSHIP BETWEEN FECUNDITY AND NET REPRODUCTIVE RATE OF ASIATIC LION IN INDIAN ZOOS
FECUNDITY/NET REPRODUCTIVE RATE
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
0
1m
6m
1yr
2 yr
3yr
4 yr
5yr
6yr
7yr
8yr
9yr
10yr
11yr
12yr
13yr
14yr
15yr
16yr
17yr
18yr
19yr
20yr
AGE CLASS
FECUNDITY
NET REPRODUCTIVE RATE

INBREEDING

Inbreeding, simply defined, is breeding between relatives. With inbreeding, mates on the average are more closely related than they would be if they had been chosen at random from the population. The reasons for inbreeding are small isolated populations, close proximity of potential mates, ecological preferences and morphological resemblences among individuals. With inbreeding the frequency of alleles does not change but homozygosity increases at the expense of heterozygosity.

The degree of inbreeding is measured by the **coefficient of inbreeding**. The coefficient of inbreeding indicates the percentage of loci that were heterozygous in the base populations that now have probably become homozygous due to the effects of inbreeding. The base population is that point in history of the population from which we desire to begin a calculation of the effects of inbreeding. Many loci are probably homozygous at the time of establishment of the base population. The inbreeding coefficient then measures the additional increase in homozygosity due to mating of closely related animals.

The coefficient of inbreeding (F) can be determined for an animal in a pedigree by several similar methods.

1. If the common ancestor is not inbred :

   $F_x = \Sigma(.5)^{p_1 + p_2 + 1}$

   Where p_1 is the number of generations from one parent back to the common ancestor and p_2 is the number of generations from the other parent back to the same ancestor.

2. If the common ancestors are inbred (F_A), the inbreeding coefficient of the individual must be corrected for this factor :

   $F_x = \Sigma[(.5)^{p_1 + p_2 + 1} (1 + F_A)]$

The following table will be helpful in calculating F.

n	$(.5)^{p_1 + p_2 + 1}$	n	$(.5)^{p_1 + p_2 + 1}$
1	.5	6	.0156
2	.25	7	.0078
3	.125	8	.0039
4	.0625	9	.0019
5	.312	10	.0009

The historical listing of Asiatic Lions in Indian Zoos and calculated coefficient of inbreeding is presented in the following pages.

ABBREVIATIONS USED IN HISTORICAL LISTING AND INBREEDING COEFFICIENTS OF ASIATIC LIONS (PANTHERA LEO PERSICA) IN INDIAN ZOOS

Sl.No.	Abbreviation	Word form
1.	DNB	Did not breed
2.	F	Female
3.	FA	Founder
4.	M	Male
5.	N.K.	Date of birth not known
6.	U	Sex unknown
7.	Unk	Unknown

HISTORICAL LISTING AND INBREEDING COEFFICIENTS OF ASIATIC LION (PANTHERA LEO PERSICA) IN INDIAN ZOOS

Stud No.	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event	Death date	Founder	No. of Progeny	Inbreeding Coefficient
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Veena	F	*	Wild	Wild	Gir Sanctuary	8.8.58	Unk	Capture		FA	DNB	0
						Junagadh	8.8.58	1	Transfer				
							9.9.69		Death	9.9.69			
2	Kant	M	29.9.93	Wild	Wild	Junagadh	29.9.63	2	Birth		FA	4	0
							14.2.73		Death	14.2.73			
3	Rohini	F	*	Wild	Wild	Gir Sanctuary	12.1.65	Unk	Capture		FA	12	0
						Junagadh	12.1.65	3	Transfer				
							12.8.83		Death	12.8.83			
4	Navin	M	*	Wild	Wild	Gir Sanctuary	20.3.66	Unk	Capture		FA	11	0
						Junagadh	20.3.66	4	Transfer				
						Borivili	20.3.76	Unk	Transfer				
									Death	29.7.76			
5	Neeta	F	*	Wild	Wild	Gir Sanctuary	20.3.66	Unk	Capture		FA	9	0
						Junagadh	20.3.66	5	Transfer				
						Kanpur	13.4.76	Unk	Transfer				
							29.3.79		Death	29.3.79			
6	Ganga	F	*	Wild	Wild	Gir Sanctuary	15.4.68	Unk	Capture		FA	DNB	0
						Junagadh	15.4.68	6	Transfer				
							17.9.75		Death	17.9.75			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
7	Ram/Badal	M	*	Wild	Wild	Gir Sanctuary Junagadh Kanpur	15.4.68 15.4.68 13.4.76 23.8.77	Unk 7 Unk	Capture Transfer Transfer Death	 23.8.77	FA	20	0
8	Shyam	M	*	Wild	Wild	Gir Sanctuary Junagadh	15.4.68 15.4.68 14.6.76	Unk 8	Capture Transfer Death	 14.6.76	FA	4	0
9	Jamuna	F	*	Wild	Wild	Gir Sanctuary Junagadh	13.6.68 13.6.68 28.9.73	Unk 9	Capture Transfer Deah	 28.9.73	FA	9	0
10	Ketan	M	4.10.70	2	9	Junagadh Ahmedabad	4.10.70 7.1.77 3.1.85	10 Unk	Birth Transfer Death	 3.1.85			0
11	Ketaki	F	4.10.70	2	9	Junagadh Borivili N.P. Pune	4.10.70 30.3.76 13.1.81	11 Unk Unk	Birth Transfer Transfer Death	 N.K.			0
12	*	F	8.7.70	2	3	Junagadh Delhi	8.7.70 21.4.72	12 Unk	Birth Transfer Death	 N.K.			0
13	*	M	8.7.70	2	3	Junagadh Delhi	8.7.70 21.4.72	13 Unk	Birth Transfer Death	 N.K.			0
14	Mayur	M	30.11.70	4	5	Junagadh Ahmedabad	30.11.70 28.11.72 3.4.82	14 Unk	Birth Transfer Death	 3.4.82			0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	*	M	30.11.70	4	5	Junagadh Jersey	30.11.70 14.4.72	15 Unk	Birth Transfer				0
16.	*	F	30.11.70	4	5	Junagadh Jersey	30.11.70 14.4.72	16 Unk	Birth Transfer				0
17	Neeti	F	22.3.72	7	3	Junagadh	22.3.72 16.11.76	17	Birth Death	16.11.76			0
18	Preeti	F	22.3.72	7	3	Junagadh Ahmedabad	22.3.72 28.11.72 17.2.86	18 Unk	Birth Transfer Death	17.2.86			0
19	Tilak	M	*	Wild	Wild	Gir Sanctuary Junagadh	20.6.72 20.6.72 23.3.75	Unk 19	Capture Transfer Death	23.3.75	FA	DNB	0
20	Shoban	M	7.7.72	4	5	Junagadh Jaipur	7.7.72 26.3.74 25.4.74	20 Unk	Birth Transfer Death	25.4.74			0
21	Shobhana	F	7.7.72	4	5	Junagadh Gir Sanctuary	7.7.72 20.5.88 13.3.94	21 Unk	Birth Transfer Death	13.3.94			0
22	*	F	2.3.73	7	9	Junagadh Negara Zoo (Malaysia)	2.3.73 13.2.75	22 Unk	Birth Transfer				0
23	*	F	2.3.73	7	9	Junagadh Jaipur	2.3.73 26.3.74 8.3.92	23 Unk	Birth Transfer Death	8.3.92			0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
24	*	F	2.3.73	7	9	Junagadh	2.3.73	24	Birth	1.5.73			0
							1.5.73		Death				
25	Sarita	F	*	Wild	Wild	Gir Sanctuary	22.5.73	Unk	Capture		FA	13	0
						Junagadh	22.5.73	25	Transfer				
									Death	N.K.			
26	*	F	9.6.73	7	3	Junagadh	9.6.73	26	Birth				0
						Jodhpur	29.3.74	Unk	Transfer				
						Kota	25.10.74	Unk	Transfer				
						Jodhpur	29.10.74	Unk	Transfer				
							30.10.92		Death	30.10.92			
27	Mohini 1	F	9.6.73	7	3	Junagadh	9.6.73	27	Birth				0
						Nandankannan	20.4.73	Unk	Transfer				
							2.11.91		Death	2.11.91			
28	Mohan 1	M	9.6.73	7	3	Junagadh	9.6.73	28	Birth				0
						Nandankannan	20.4.74		Transfer				
							20.12.82	Unk	Death	20.12.82			
29	*	F	17.7.80	28	27	Nandankannan	17.7.80	Unk	Birth				0.5
							22.7.80		Death	22.7.80			
30	*	F	14.4.81	28	27	Nandankannan	14.4.81	Unk	Birth				0.5
							15.4.81		Death	15.4.81			
31	*	F	14.4.81	28	27	Nandankannan	14.4.81	Unk	Birth				0.5
							18.4.81		Death	18.4.81			
32	Madan	M	8.9.81	28	27	Nandankannan	8.9.81	Unk	Birth				0.5
							27.5.94		Death	27.5.94			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
33	*	M	11.6.73	4	12	Junagadh	11.6.73 21.8.73	29	Birth Death	21.8.73			0
34	*	M	11.6.73	4	12	Junagadh Jodhpur	11.6.73 29.3.74 25.4.74	30 Unk	Birth Transfer Death	25.4.74			0
35	*	M	30.7.73	4	5	Junagadh	30.7.73 15.1.74	31	Birth Death	15.1.74			0
36	*	M	30.7.73	4	5	Junagadh	30.7.73 9.2.74	32	Birth Death	9.2.74			0
37	Sushma	F	*	Wild	Wild	Gir Sanctuary Junagadh	27.10.73 27.10.73 1.10.81	Unk 33	Capture Transfer Death	1.10.81	FA	7	0
38	Mumtaj-1	F	*	Wild	Wild	Gir Sanctuary Junagadh Chatbir	4.4.74 4.4.74 15.1.78 4.6.80	Unk 34 Unk	Capture Transfer Transfer Death	4.6.80	FA	7	0
39	Shithyam	F	4.6.74	7	3	Junagadh Hyderabad	4.6.74 27.3.76 29.2.91	35 Unk	Birth Transfer Death	29.2.91			0
40	*	F	4.6.74	7	3	Junagadh Delhi Zoo Malaysia	4.6.74 13.2.75	36 Unk Unk	Birth Transfer Transfer				0
41	Rohini	F	4.6.74	7	3	Junagadh Trivandrum	4.6.74 4.3.75 20.6.89	37 Unk	Birth Transfer Death	20.6.89			0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
42	*	F	4.6.74	7	3	Junagadh	4.6.74 6.4.75	38	Birth Death	 6.4.75			0
43	*	M	7.6.74	8	12	Junagadh Delhi	7.6.74 13.2.75	39	Birth Transfer Death	 N.K.			0
44	*	F	7.6.74	8	12	Junagadh Shimla	7.6.74 20.5.75	40 Unk	Birth Transfer Death	 N.K.			0
45	*	F	17.6.74	4	5	Junagadh	17.6.74 19.7.74	41	Birth Death	 19.7.74			0
46	Ram	M	4.6.74	7	3	Junagadh Trivandrum	4.6.74 9.3.75 22.3.89	42 Unk	Birth Transfer Death	 22.3.89			125
47	*	M	22.9.80	46	41	Trivandrum Senthil Circus	22.9.80 13.2.85	Unk Unk	Birth Transfer				125
48	*	M	22.9.80	46	41	Trivandrum	22.9.80 9.1.81	Unk	Birth Death	 9.1.81			125
49	Sajiv	M	29.6.81	46	41	Trivandrum Calcutta	29.6.81 16.1.84	Unk Unk	Birth Transfer				125
50	Ambli	F	29.6.81	46	41	Trivandrum Calcutta	29.6.81 16.1.84	Unk Unk	Birth Transfer				125
51	*	M	16.9.85	46	41	Trivandrum	16.9.85 7.11.92	Unk	Birth Death	 7.11.92			125

1	2	3	4	5	6	7	8	9	10	11	12	13	14
52	Gauri	F	16.9.85	46	41	Trivandrum	16.9.85	Unk	Birth				125
53	Mani	M	23.12.86	46	41	Trivandrum	23.12.86	Unk	Birth				125
54	*	M	4.7.74	7	37	Junagadh Shimla	4.7.74 20.5.75	43	Birth Transfer Death	 N.K.			0
55	*	F	4.7.74	7	37	Junagadh Shimla	4.7.74 8.11.75	44 Unk	Birth Transfer Death	 N.K.			0
56	*	M	8.11.74	4	5	Junagadh Bikaner	8.11.74 23.1.76 17.5.77	45 Unk	Birth Transfer Death	 17.5.77			0
57	*	F	8.11.74	4	5	Junagadh Bikaner Jaipur	8.11.74 23.1.76 2.3.83 7.1.86	46 Unk Unk	Birth Transfer Transfer Death	 7.1.86			0
58	*	M	9.5.75	8	11	Junagadh	9.5.75 12.9.75	47	Birth Death	 12.9.75			0
59	*	F	9.5.75	8	11	Junagadh	9.5.75 20.3.76	48	Birth Death	 20.3.76			0
60	*	F	24.6.75	7	38	Junagadh	24.6.75 19.3.76	49	Birth Death	 19.3.76			0
61	*	F	24.6.75	7	38	Junagadh	24.6.75 27.3.76	50	Birth Death	 27.3.76			0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
62	*	F	24.6.75	7	38	Junagadh	24.6.75	51	Birth				0
						Hyderabad	27.3.76	Unk	Transfer				
							8.5.76		Death	8.5.76			
63	Sundari	F	18.8.75	7	3	Junagadh	18.8.75	52	Birth				0
						Hyderabad	27.3.76	Unk	Transfer				
							21.1.77		Death	21.1.77			
64	*	F	*	Wild	Wild	Gir Sanctuary	25.5.76	Unk	Capture		FA	DNB	0
						Junagadh	25.5.76	53	Transfer				
						Hyderabad	28.11.76	Unk	Transfer				
							22.6.91		Death	22.6.91			
65	Kamini	F	*	Wild	Wild	Gir Sanctuary	25.5.76	Unk	Capture		FA	19	0
						Junagadh	25.5.76	54	Transfer				
							29.4.95		Death	29.4.95			
66	*	M	26.7.76	7	38	Junagadh	26.7.76	55	Birth				0
							7.10.76		Death	7.10.76			
67	Kalpana	F	26.7.76	7	38	Junagadh	26.7.76	56	Birth				0
							4.4.77		Death	4.4.77			
68	Chetak		*	Wild	Wild	Gir Sanctuary	11.1.77	57	Capture		FA	5	0
						Junagadh	11.1.77		Transfer				
							25.9.81		Death	25.9.81			
69	Sunder	M	*	Wild	Wild	Gir Sanctuary	14.5.77	Unk	Capture		FA	51	0
						Junagadh	14.5.77	58	Transfer				
							1.1.91		Death	1.1.91			
70	*	M	10.4.77	10	38	Junagadh	10.4.77	59	Birth				0
						Chatbir	15.1.78	Unk	Transfer				
							5.10.84		Death	5.10.84			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
71	*	F	10.4.74	10	38	Junagadh	10.4.77	60	Birth				0
						Chatbir	15.1.78	Unk	Transfer				
							18.6.90		Death	18.6.90			
72	*	M	28.8.77	68	21	Junagadh	28.8.77	61	Birth				0
						Kanpur	25.8.78	Unk	Transfer				
									Death	N.K.			
73	Heer	F	28.8.77	68	21	Junagadh	28.8.77	62	Birth				0
						Kanpur	25.8.78	Unk	Transfer				
						Lucknow	16.9.78	Unk	Transfer				
74	*	F	28.8.77	68	21	Junagadh	28.8.77	63	Birth				0
							18.2.80		Death	18.2.80			
75	Malini	F	24.1.78	68	37	Junagadh	24.1.78	64	Birth				0
							16.4.88		Death	16.4.88			
76	Sheila	F	24.1.78	68	37	Junagadh	24.1.78	65	Birth				0
							26.6.95		Death	26.6.95			
77	Pratima	F	*	Wild	Wild	Gir Sanctuary	23.7.78	Unk	Capture		FA	3	0
						Junagadh	23.7.78	66	Transfer				
							30.11.82		Death	30.11.82			
78	Keshav	M	14.8.78	69	25	Junagadh	14.8.78	67	Birth				0
						Rajkot	21.1.92	Unk	Transfer				
							17.5.93		Death	17.5.93			
79	Kanku	F	14.8.78	69	25	Junagadh	14.8.78	68	Birth				0
						Ahmedabad	5.5.83	Unk	Transfer				
							15.10.89		Death	15.10.89			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
80	Raja	M	21.11.79	69	37	Junagadh Ahmedabad	27.11.79 5.5.83	69 Unk	Birth Transfer Death	 N.K.			0
81	Jigar	M	27.11.79	69	37	Junagadh Ahmedabad	27.11.79 21.1.81 7.5.89	70 Unk	Birth Transfer Death	 7.5.89			0
82	Poonam	F	27.11.79	69	37	Junagadh Ahmedabad	27.11.79 21.1.81 11.9.89	71 Unk	Birth Transfer Death	 11.9.89			0
83	Dilawar (Tony)	M	20.2.80	69	21	Junagadh Ahmedabad	20.2.80 5.9.89 8.7.94	72 Unk	Birth Transfer Death	 8.7.94			0
84	Rustam	M	20.2.80	69	21	Junagadh Banerghata	20.2.80 14.12.89 10.10.95	73 Unk	Birth Transfer Death	 10.10.95			0
85	Mumtaj-II	F	20.2.80	69	21	Junagadh Ahmedabad	20.2.80 5.9.89 11.3.92	74 Unk	Birth Transfer Death	 11.3.92			0
86	Rukhsana	F	20.2.80	69	21	Junagadh	20.2.80 23.10.89	75	Birth Death	 23.10.89			0
87	Willium	M	26.3.80	69	65	Junagadh	26.3.80 26.1.97	76	Birth Death	 26.1.97			0
88	Tomy	M	26.3.80	69	65	Junagadh	26.3.80 30.3.91	77	Birth Death	 30.3.91			0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
89	Radha	F	26.3.80	69	65	Junagadh	26.3.80	78	Birth				0
							8.3.87		Death	8.3.87			
90	Mohan-II	M	6.8.80	69	25	Junagadh	6.8.80	79	Birth				0
						Nandankannan	15.2.83	Unk	Transfer				
							2.7.87		Death	2.7.87			
91	Madhavi	F	6.8.80	69	25	Junagadh	6.8.80	80	Birth				0
						Nandankannan	15.2.83	Unk	Transfer				
							9.10.92		Death	9.10.92			
92	*	U	27.7.84	90	27	Nandankannan	27.7.84	Unk	Birth				0
							28.7.84		Death	28.7.84			
93	*	U	9.12.84	90	27	Nandankannan	9.12.84	Unk	Birth				0
							21.12.84		Death	21.12.84			
94	*	M	27.5.85	90	27	Nandankannan	27.5.85	Unk	Birth				0
							14.10.85		Death	14.10.85			
95	*	F	27.5.85	90	27	Nandankannan	27.5.85	Unk	Birth				0
							14.9.85		Death	14.9.85			
96	Manasi	F	27.5.85	90	27	Nandankannan	27.5.85	Unk	Birth				
							3.4.96		Death	3.4.96			
97	Manini	F	27.5.85	90	27	Nandankannan	27.5.85	Unk	Birth				0
						Mysore Zoo	6.12.96		Transfer				
98	Nawab	M	26.11.81	69	77	Junagadh	26.11.82	81	Birth				0
							25.5.82		Death	25.5.82			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
99	Kadar	M	26.11.81	69	77	Junagadh	26.11.81	82	Birth				0
							28.2.88		Death	28.2.88			
100	Mina	F	26.11.81	69	77	Junagadh	26.11.81	83	Birth				0
						Rajkot	22.1.92	Unk	Transfer				
101	Masihan	F	15.12.81	69	25	Junagadh	15.12.81	84	Birth				0
						Rajkot	24.1.92	Unk	Transfer				
102	Sangita	F	15.12.81	69	25	Junagadh	15.12.81	85	Birth				0
103	*	F	15.12.81	69	25	Junagadh	15.12.81	86	Birth				0
							17.12.81		Death	17.12.81			
104	Bhavana	F	24.2.82	69	21	Junagadh	24.2.82	87	Birth				0
						Madras	22.9.89	Unk	Transfer				
105	*	M	24.2.82	69	21	Junagadh	24.2.82	88	Birth				0
							26.2.82		Death	26.2.82			
106	*	F	24.2.82	69	21	Junagadh	24.2.82	89	Birth				0
							2.3.82		Death	2.3.82			
107	Rakesh	M	19.3.82	69	65	Junagadh	19.3.82	90	Birth				0
							9.4.82		Death	9.4.82			
108	Santosh	M	19.3.82	69	65	Junagadh	19.3.82	91	Birth				0
						Hyderabad	29.1.87	AL-0001	Transfer				
109	Rakhi	F	19.3.82	69	65	Junagadh	19.3.82	92	Birth				0
							10.9.98		Death	10.9.98			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
110	*	F	13.7.82	Unk	21	Junagadh	13.7.82	93	Birth				0
							15.7.82		Death	15.7.82			
111	*	F	13.7.82	Unk	21	Junagadh	13.7.82	94	Birth				0
							16.7.82		Death	16.7.82			
112	*	F	13.7.82	Unk	21	Junagadh	13.7.82	95	Birth				0
							23.7.82		Death	23.7.82			
113	*	F	13.7.82	Unk	21	Junagadh	13.7.82	96	Birth				0
							13.7.82		Death	13.7.82			
114	*	F	13.7.82	69	21	Junagadh	13.7.82	97	Birth				0
							15.11.82		Death	15.11.82			
115	*	U	16.12.82	78	76	Junagadh	16.12.82	98	Birth				0
							17.12.82		Death	17.12.82			
116	*	F	9.2.83	78	75	Junagadh	9.2.83	99	Birth				0
							7.3.83		Death	7.3.83			
117	Pruthvi	F	9.2.83	78	75	Junagadh	9.2.83	100	Birth				0
						Hyderabad	29.1.87	AL-0002	Transfer				
							16.5.97		Death	16.5.97			
118	*	M	9.2.83	78	75	Junagadh	9.2.83	101	Birth				0
						Madras	18.8.94	Unk	Transfer				
119	*	F	9.2.83	78	75	Junagadh	9.2.83	102	Birth				0
							7.3.84						
120	*	M	12.5.83	69	21	Junagadh	12.5.83	103	Birth				0
						K.Lal	16.5.83		Transfer				

1	2	3	4	5	6	7	8	9	10	11	12	13	14
121	Nilam	M	12.5.83	69	21	Junagadh	12.5.83	104	Birth				0
						Bhopal	25.9.86	Unk	Transfer				
							13.11.90		Death	13.11.90			
122	Shivani	F	12.5.83	69	21	Junagadh	12.5.83	105	Birth				0
						Hyderabad	29.1.87	AL-0003	Transfer				
123	Jaggu	M	24.3.90	108	122	Hyderabad	24.3.90	Unk	Birth				0
						Lucknow	21.9.96		Transfer				
124	Nandini	F	13.4.93	108	122	Hyderabad	13.4.93	Unk	Birth				0
						Lucknow	21.9.96	AL-0007	Transfer				
125	Nalini	F	13.4.93	108	122	Hyderabad	13.4.93	AL-0008	Birth				0
							9.9.98		Death	9.9.98			
126	Ashwini	F	13.4.93	108	122	Hyderabad	13.4.93	Unk	Birth				0
						Lucknow	21.9.96	AL-0009	Transfer				
127	*	M	15.7.83	69	65	Junagadh	15.7.83	106	Birth				0
							27.7.83		Death	27.7.83			
128	Vijaya	F	7.9.83	69	25	Junagadh	7.9.83	107	Birth				0
						Madras	18.8.84	Unk	Transfer				
							4.7.96		Death	4.7.96			
129	Kanchan	F	7.9.83	69	25	Junagadh	7.9.83	108	Birth				0
							10.11.85		Death	10.11.85			
130	Gira/Rani	F	7.9.83	69	25	Junagadh	7.9.83	109	Birth				0
						Bhopal	25.9.86	Unk	Transfer				

1	2	3	4	5	6	7	8	9	10	11	12	13	14
131	*	U	20.11.83	Unk	65	Junagadh	20.11.83 20.11.83	110	Birth Death	 20.11.83			?
132	Jessica	F	*	Wild	wild	Gir Sanctuary Junagadh	18.1.84 18.1.84 23.7.98	111	Capture Transfer Death	 23.7.98	FA	DNB	0
133	*	U	1.6.84	Unk	65	Junagadh	1.6.84 2.6.84	112	Birth Death	 2.6.84			?
134	*	F	6.6.84	78	76	Junagadh	6.6.84 10.6.84	113	Birth Death	 10.6.84			0.0625
135	*	F	6.6.84	78	76	Junagadh	6.6.84 11.6.84	114	Birth Death	 11.6.84			0.0625
136	*	F	6.6.84	78	76	Junagadh	6.6.84 12.6.84	115	Birth Death	 12.6.84			0.0625
137	*	F	6.6.84	78	76	Junagadh	6.6.84 16.6.84	116	Birth Death	 16.6.84			0.0625
138	*	M	6.6.84	78	75	Junagadh	6.6.84 18.6.84	117	Birth Death	 18.6.84			0.0625
139	Mithun	M	17.7.84	78	76	Junagadh Pune V.J.B.U.	17.7.84 5.4.88 20.2.98	118 Unk	Birth Transfer Transfer				0.0625
140	Juna	F	17.7.84	78	75	Junagadh Bhopal	17.7.84 29.9.86 31.5.89	119 Unk	Birth Transfer Death	 31.5.89			0.0625

1	2	3	4	5	6	7	8	9	10	11	12	13	14
141	*	U	26.8.84	69	Unk	Junagadh	26.8.84	120	Birth				?
							26.8.84		Death	26.8.84			
142	*	U	26.8.84	69	Unk	Junagadh	26.8.84	121	Birth				?
							3.9.84		Death	3.9.84			
143	*	F	22.9.84	Unk	86	Junagadh	22.9.84	122	Birth				?
							23.9.84		Death	23.9.84			
144	*	F	19.10.84	78	65	Junagadh	19.10.84	123	Birth				0
							21.10.84		Death	21.10.84			
145	*	F	19.10.84	78	65	Junagadh	19.10.84	124	Birth				0
							30.10.84		Death	30.10.84			
146	*	M	19.10.84	78	65	Junagadh	19.10.84	125	Birth				0
							15.11.84		Death	15.11.84			
147	*	M	19.10.84	78	65	Junagadh	19.10.84	126	Birth				0
									Death	N.K.			
148	*	F	30.11.84	69	21	Junagadh	30.11.84	127	Birth				0
							30.8.85		Death	30.8.85			
149	Minu	F	30.11.84	69	21	Junagadh	30.11.84	128	Birth				0
						Pune	5.4.88	Unk	Transfer				
							16.7.91		Death	16.7.91			
150	Raja	M	15.1.85	69	132	Junagadh	15.1.85	129	Birth				0
						Shimoga	6.4.88	Unk	Transfer				
							31.8.95		Death	31.8.95			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
151	*	M	15.1.85	69	132	Junagadh	15.1.85	130	Birth				0
							19.11.85		Death	19.11.85			
152	*	F	15.1.85	69	132	Junagadh	15.1.85	131	Birth				0
							29.12.85		Death	29.12.85			
153	Heena	F	15.1.85	69	132	Junagadh	15.1.85	132	Birth				0
						Madras	22.9.89	Unk	Transfer				
						Kanpur	3.12.92	Unk	Transfer				
							31.9.95		Death	31.9.95			
154		M	13.2.85	69	76	Junagadh	13.2.85	133	Birth				0.125
							14.2.85		Death	14.2.85			
155		F	13.2.85	69	76	Junagadh	13.2.85	134	Birth				0.125
							14.2.85		Death	14.2.85			
156	*	U	13.2.85	69	76	Junagadh	13.2.85	135	Birth				0.125
							15.2.85		Death	15.2.85			
157	*	U	13.2.85	69	76	Junagadh	13.2.85	136	Birth				0.125
							16.2.85		Death	16.2.85			
158	*	M	18.3.85	87	86	Junagadh	13.3.85	137	Birth				0.125
							18.3.85		Death	18.3.85			
159	*	M	18.3.85	87	86	Junagadh	18.3.85	138	Birth				0.125
							19.3.85		Death	19.3.85			
160	*	F	18.3.85	87	86	Junagadh	18.3.85	139	Birth				0.125
							24.3.85		Death	24.3.85			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
161	Ravi	M	5.4.85	69	25	Junagadh Gir Safari Park	5.4.85 20.11.88	140	Birth Transfer				0
162	Aarti	F	5.4.85	69	25	Junagadh Madras	5.4.85 22.9.89 27.12.91	141 Unk	Birth Transfer Death	 27.12.91			0
163	Jimmy	M	7.6.85	69	65	Junagadh Madras	7.6.85 22.9.89 15.12.91	142 Unk	Birth Transfer Death	 15.12.91			0
164	Surya	M	8.10.90	163	162	Madras	8.10.90	Unk	Birth				0.125
165	Chandran	M	8.10.90	163	162	Madras	8.10.90 1991	Unk	Birth Death	 1991			0.125
166	Meena	F	8.10.90	163	162	Madras	8.10.90	Unk	Birth				0.125
167	*	F	7.5.85	69	65	Junagadh	7.5.85 22.11.85	143	Birth Death	 22.11.85			0
168	*	M	10.6.85	87	85	Junagadh	10.6.85 13.6.85	144	Birth Death	 13.6.85			0.0625
169	*	F	10.6.85	87	85	Junagadh	10.6.85 13.6.85	145	Birth Death	 13.6.85			0.0625
170	*	F	10.6.85	87	85	Junagadh	10.6.85 13.6.85	146	Birth Death	 13.6.85			0.0625
171	*	U	30.7.85	Unk	86	Junagadh	30.7.85 2.8.85	147	Birth Death	 2.8.85			?

1	2	3	4	5	6	7	8	9	10	11	12	13	14
172	*	U	30.7.85	Unk	86	Junagadh	30.7.85	148	Birth				
							3.8.85		Death	3.8.85			
173	Jeni	F	29.9.85	99	75	Junagadh	29.9.85	149	Birth				0
							27.10.88		Death	27.10.88			
174	Sarika	F	29.9.85	99	75	Junagadh	29.9.85	150	Birth				0
						Gir Safari Park	11.12.87	Unk	Transfer				
175	Sapana	F	29.9.85	99	75	Junagadh	29.9.85	151	Birth				0
						Bannerghata	14.12.89	Unk	Transfer				
176	Sonia	F	29.9.85	99	75	Junagadh	29.9.85	152	Birth				0
						Bannerghata	14.12.89	Unk	Transfer				
177	Ramu	M	26.6.90	84	176	Bannerghata	26.6.90	Unk	Birth				0.03125
178	Laxman	M	26.6.90	84	176	Bannerghata	26.6.90	Unk	Birth				0.03125
						Mysore	1.8.95	Unk	Transfer				
179	Madhuri	F	26.6.90	84	176	Bannerghata	26.6.90	Unk	Birth				0.03125
						Mysore	18.1.95		Transfer				
180	*	U	4.1.86	87	85	Junagadh	4.1.86	153	Birth				0.0625
							4.1.86		Death	4.1.86			
181	*	U	4.1.86	87	85	Junagadh	4.1.86	154	Birth				0.0625
							8.1.86		Death	8.1.86			
182	*	U	4.1.86	87	85	Junagadh	4.1.86	155	Birth				0.0625
							8.1.86		Death	8.1.86			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
183	Leena	F	30.1.86	99	21	Junagadh	30.1.86	156	Birth				0
						Gir Safari	20.5.88	Unk	Transfer				
184	Yogita	F	30.1.86	99	21	Junagadh	30.1.86	157	Birth				0
						Gir Safari	20.5.88	Unk	Transfer				
185	*	M	19.3.86	87	85	Junagadh	19.3.86	158	Birth				0.0625
							23.3.86		Death	23.3.86			
186	*	F	19.3.86	87	85	Junagadh	19.3.86	159	Birth				0.0625
							24.3.86		Death	24.3.86			
187	*	U	12.4.86	Unk	Unk	Junagadh	12.4.86	160	Birth				?
							15.4.86		Death	15.4.86			
188	*	U	12.4.86	Unk	Unk	Junagadh	12.4.86	161	Birth				?
							16.4.86		Death	16.4.86			
189	*	U	12.4.86	Unk	Unk	Junagadh	12.4.86	162	Birth				?
							16.4.86		Death	16.4.86			
190.	*	M	24.5.86	Unk	86	Junagadh	24.5.86	163	Birth				?
							28.5.86		Death	28.5.86			
191	*	M	24.5.86	Unk	86	Junagadh	24.5.86	164	Birth				?
							28.5.86		Death	28.5.86			
192	*	M	24.5.86	Unk	86	Junagadh	24.5.86	165	Birth				?
							1.7.86		Death	1.7.86			
193	*	M	24.5.86	Unk	86	Junagadh	24.5.86	166	Birth				?
									Death	N.K.			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
194	*	U	26.5.86	Unk	Unk	Junagadh	26.5.86	167	Birth				?
									Death	N.K.			
195	*	M	3.6.86	Unk	Unk	Junagadh	3.6.86	168	Birth				?
							4.6.86		Death				
196	*	M	3.6.86	Unk	Unk	Junagadh	3.6.86	169	Birth				?
							4.6.86		Death	4.6.86			
197	*	U	8.6.86	Unk	104	Junagadh	8.6.86	170	Birth				?
							9.6.86		Death	9.6.86			
198	*	U	8.6.86	Unk	104	JUnagadh	8.6.86	171	Birth				?
							11.6.86		Death	11.6.86			
199	*	M	8.6.86	Unk	104	Junagadh	8.6.86	172	Birth				?
							16.6.86		Death	16.6.86			
200	*	U	8.6.86	Unk	104	Junagadh	8.6.86	173	Birth				?
									Death	N.K.			
201	*	F	11.7.86	78	76	Junagadh	11.7.86	174	Birth				0
							5.1.87		Death	5.1.87			
202	Raman	M	20.7.86	99	65	Junagadh	20.7.86	175	Birth				0
						Madras	22.9.89	Unk	Transfer				
							27.11.91		Death	27.11.91			
203	Parul	F	20.7.86	99	65	Junagadh	20.7.86	176	Birth				0
						Shimoga	6.4.88	Unk	Transfer				
204	*	U	2.8.86	Unk	Unk	Junagadh	2.8.86	177	Birth				?
							3.8.86		Death	3.8.86			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
205	*	U	2.8.86	Unk	Unk	Junagadh	2.8.86	178	Birth				
									Death	N.K.			?
206	Priyanka	F	2.8.86	99	100	Junagadh	2.8.86	179	Birth				0.125
						Shimoga	6.4.88	Unk	Transfer				
207	Amit	M	24.10.86	83	85	Junagadh	24.10.86	180	Birth				0.125
							7.5.87		Death	7.5.87			
208	Birwa	F	24.10.86	83	85	Junagadh	24.10.86	181	Birth				0.125
							25.5.87		Death	25.5.87			
209	Asha	F	24.10.86	83	85	Junagadh	24.10.86	182	Birth				0.125
							27.7.87		Death	27.7.87			
210	Jyoti	F	24.10.86	83	85	Junagadh	24.10.86	183	Birth				0.125
						Shimoga	6.4.88	Unk	Transfer				
211	*	M	30.11.93	150	210	Shimoga	30.11.93	Unk	Birth				0.07031
							30.11.93		Death	30.11.93			
212	Rashmi	F	30.11.93	150	210	Shimoga	30.11.93	Unk	Birth				0.07031
213	Deep	M	29.11.86	84	86	Junagadh	29.11.89	184	Birth				0.125
							2.12.93		Death	2.12.93			
214	Zarina	F	29.10.86	84	86	Junagadh	29.10.86	185	Birth				0.125
							20.8.87		Death	20.8.87			
215	*	M	29.10.86	84	86	Junagadh	29.10.86	186	Birth				0.125
							29.10.86		Death	29.10.86			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
216	*	U	29.10.86	84	86	Junagadh	29.10.86	187	Birth				0.125
							30.10.86		Death	30.10.86			
217	*	U	5.1.87	Unk	Unk	Junagadh	5.1.87	188	Birth				?
									Death	N.K.			
218	*	F	5.1.87	83	85	Junagadh	5.1.87	189	Birth				0.125
							25.5.87		Death	25.5.87			
219	*	F	5.1.87	83	85	Junagadh	5.1.87	190	Birth				0.125
							27.7.87		Death	27.7.87			
220	*	F	5.1.87	Unk	86	Junagadh	5.1.87	191	Birth				?
							28.8.87		Death	28.8.87			
221	*	U ?	21.2.87	99	100	Junagadh	21.2.87	192	Birth				0.125
							27.2.87		Death	27.2.87			
222	*	U	21.2.87	99	100	Junagadh	21.2.87	193	Birth				0.125
							23.2.87		Death	23.2.87			
223	Asha	F	*	Wild	Wild	Gir Sanctuary	7.10.87	Unk	Capture		FA	DNB	0
						Junagadh	7.10.87	194	Transfer				
							9.3.90		Death	9.3.90			
224	*	U	13.2.88	Unk	Unk	Junagadh	13.2.88	195	Birth				
							14.2.88		Death	14.2.88			?
225	*	F	15.5.88	Unk	65	Junagadh	15.5.88	196	Birth				?
							20.5.88		Death	20.5.88			
226	*	F	15.5.88	Unk	65	Junagadh	15.5.88	197	Birth				?
							20.5.88		Death	20.5.88			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
248	*	U ?	10.4.89	87	153	Junagadh	10.4.89 10.4.89	219	Birth Death	10.4.89			0.0625
249	Sikandar	M	10.4.89	Wild	244	Junagadh	10.4.89 29.7.89	220	Birth Death	29.7.89			0
250	*	M	10.4.89	Wild	244	Junagadh	10.4.89 12.4.89	221	Birth Death	12.4.89			0
251	Abha/Rita	F	10.4.89	Wild	244	Junagadh Delhi	10.4.89 25.1.91	222 Unk	Birth Transfer				0
252	Sulaxana Situ	F	10.4.89	Wild	244	Junagadh Delhi	10.4.89 25.1.91	223 Unk	Birth Transfer				0
253	Chandani	F	2.5.89	84	86	Junagadh Delhi	2.5.89 7.3.90	224 Unk	Birth Transfer Death	N.K.			0.125
254	Ruchi	F	2.5.89	84	86	Junagadh Delhi	2.5.89 7.3.90	225 Unk	Birth Transfer Death	N.K.			0.125
255	Tina	F	*	Wild	Wild	Gir Sanctuary Junagadh	8.5.89 8.5.89 5.9.98	Unk 226	Capture Transfer Death	5.9.98			0
256	*	M	14.8.98	69	162	Junagadh	14.8.89 24.8.89	227	Birth Death	24.8.89			0.125
257	*	F	14.8.89	69	162	Junagadh	14.8.89 20.8.89	228	Birth Death	20.8.89			0.125

1	2	3	4	5	6	7	8	9	10	11	12	13	14
258	*	M	5.9.89	Unk	65	Junagadh	5.9.89	229	Birth				?
							6.9.89		Death	6.9.89			
259	Sukeshi	F	*	Wild	Wild	Gir Sanctuary	28.2.90	Unk	Capture		FA	7	0
						Junagadh	28.2.90	230	Transfer				
260	Bijlee	F	*	Wild	Wild	Gir Sanctuary	28.2.90	Unk	Capture		FA	7	0
						Junagadh	28.2.90	231	Transfer				
261	Priya	F	*	Wild	Wild	Gir Sanctuary	28.2.90	Unk	Capture		FA	10	0
						Junagadh	28.2.90	232	Transfer				
							12.12.96		Death	12.12.96			
262	*	M	*	Wild	Wild	Gir Sanctuary	28.2.90	Unk	Capture		FA	DNB	0
						Junagadh	28.2.90	233	Transfer				
						Delhi	7.3.90	Unk	Transfer				
						London	22.12.90	A 1270	Transfer				
263	*	M	*	Wild	Wild	Gir Sanctuary	28.2.90	Unk	Capture		FA	DNB	0
						Junagadh	28.2.90	234	Transfer				
						Delhi	7.3.90	Unk	Transfer				
						Landon	22.12.90	A 1269	Transfer				
264	Navin	M	*	Wild	Wild	Gir Sanctuary	1.3.90	Unk	Capture		FA	5	0
						Junagadh	1.3.90	235	Transfer				
						Veermata	19.3.91	Unk	Transfer				
							13.2.97		Death	13.2.97			
265	Ramu	M	*	Wild	Wild	Gir Sanctuary	1.3.90	Unk	Capture		FA	DNB	0
						Junagadh	1.3.90	236	Transfer				
						Delhi	25.1.91	Unk	Transfer				
							26.10.97		Death	26.10.97			

1 2	3	4	5	6	7	8	9	10	11	12	13	14
266 Anita	F	*	Wild	Wild	Gir Sanctuary Junagadh Veermata	1.3.90 1.3.90 19.3.91	Unk 237 Unk	Capture Transfer Transfer		FA	6	0
267 Carol	F	*	Wild	Wild	Gir Sanctuary Junagadh Hyderabad	1.3.90 1.3.90 29.11.98	Unk 238	Capture Transfer Transfer		FA	4	0
268 Rupa	F	*	Wild	Wild	Gir Sanctuary Junagadh Hyderabad	1.3.90 1.3.90 29.11.98	Unk 239	Capture Transfer Transfer		FA	4	0
269 Madhuri	F	9.6.90	87	132	Junagadh	9.6.90	240	Birth				0
270 Hema	F	9.6.90	87	132	Junagadh	9.6.90	241	Birth				0
271 *	M	17.9.90	87	244	Junagadh	17.9.90 20.9.90	242	Birth Death	20.9.90			0
272 *	M	17.9.90	87	244	Junagadh	17.7.90 28.9.90	243 244	Birth Death	28.9.90			0
274 *	U	2.11.90	78	76	Junagadh	2.11.90 2.11.90	245	Birth Death	2.11.90			0
275 *	M	31.1.91	87	102	Junagadh	31.1.91 5.2.91	246	Birth Death	5.2.91			0.0625
276 *	F	31.1.91	87	102	Junagadh	31.1.91 5.2.91	247	Birth Death	5.2.91			0.0625
277 *	F	31.1.91	87	102	Junagadh	31.1.91 5.2.91	248	Birth Death	5.2.91			0.0625

1	2	3	4	5	6	7	8	9	10	11	12	13	14
278	*	M	31.1.91	87	102	Junagadh	31.1.91 5.2.91	249	Birth Death	 5.2.91			0.0625
279	*	M	6.3.91	87	101	Junagadh	6.3.91 12.3.91	250	Birth Death	 12.3.91			0.0625
280	Lesley	F	6.3.91	87	101	Junagadh Helsinki	6.3.91 27.11.92	251	Birth Transfer				0.0625
281	*	M	20.3.91	87	102	Junagadh	20.3.91 22.3.91	252	Birth Death	 22.3.91			0.0625
282	*	F	20.3.91	87	102	Junagadh	20.3.91 22.3.91	253	Birth Death	 22.3.91			0.0625
283	Krithida	F	20.3.91	87	102	Junagadh Helsinki	20.3.91 27.11.92	254 Unk	Birth Transfer				0.0625
284	Pamela	F	20.3.91	87	102	Junagadh	20.3.91	255	Birth				0.0625
285	*	F	30.3.91	78	76	Junagadh	30.3.91 31.3.91	256	Birth Death	 31.3.91			0
286	*	F	30.3.91	78	76	Junagadh	30.3.91 31.3.91	257	Birth Death	 31.3.91			0
287	*	F	30.3.91	78	76	Junagadh	30.3.91 31.3.91	258	Birth Death	 31.3.91			0
288	Vinay	M	14.7.91	87	132	Junagadh	14.7.91 3.10.92	259	Birth Death	 3.10.92			0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
289	Rukamani	F	14.7.91	87	132	Junagadh	14.7.91	260	Birth				0
290	Amitabh	M	10.8.91	87	109	Junagadh Safari Park Junagadh	10.8.91 25.10.98 12.1.99	261	Birth Transfer Transfer				0.125
291	*	M	21.8.91	78	76	Junagadh	21.8.91 22.8.91	261	Birth Death	22.8.91			0
292	*	M	21.8.91	78	76	Junagadh	21.8.91 22.8.91	263	Birth Death	22.8.91			0
293	*	F	21.8.91	78	76	Junagadh	21.8.91 27.8.91	264	Birth Death	27.8.91			
294	*	M	29.11.91	78	Unk	Junagadh	29.11.91 2.12.91	265	Birth Death	2.12.91			?
295	*	M	29.11.91	78	Unk	Junagadh	29.11.91 2.12.91	266	Birth Death	2.12.91		Dam N.K.	
296	*	M	29.11.91	78	Unk	Junagadh	29.11.91 2.12.91	267	Birth Death	2.12.91		Dam N.K.	
297	*	M	13.12.91	78	76	Junagadh	13.12.91 13.12.91	268	Birth Death	13.12.91			0
298	*	M	13.12.91	78	76	Junagadh	13.12.91 13.12.91	269	Birth Death	13.12.91			0
299	Jan	F	*	Wild	Wild	Gir Sanctuary Junagadh Hyderabad	16.12.91 16.12.91 29.11.98	Unk 270	Capture Transfer Transfer		FA	2	0
300	Poul	M	*	Wild	Wild	Gir Sanctuary Junagadh Kanpur	1.1.92 1.1.92 15.11.98	Unk 271	Capture Transfer Transfer		FA	3	0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
301	*	M	1.4.92	228	229	Junagadh	1.4.92 3.4.92	272	Birth Death	3.4.92			0
302	*	M	1.4.92	228	229	Junagadh	1.4.92 3.4.92	273	Birth Death	3.4.92			0
303	*	F	1.4.92	228	229	Junagadh	1.4.92 3.4.92	274	Birth Death	3.4.92			0
303	*	F	1.4.92	228	229	Junagadh	1.4.92 3.4.92	274	Birth Death	3.4.92			0
304	*	F	1.4.92	228	229	Junagadh	1.4.92 29.4.92	275	Birth Death	29.4.92			0
305	Mohan	M	20.5.92	87	244	Junagadh	20.5.92 14.6.94	276	Birth Death	14.6.94			0
306	Rohan	M	20.5.92	87	244	Junagadh Singapur	20.5.92 14.5.94	277	Birth Transfer				0
307	*	U	31.7.92	228	76	Junagadh	31.7.92 31.7.92	278	Birth Death	31.7.92			0
308	*	M	2.8.92	87	Unk	Junagadh	2.8.92 3.8.92	279	Birth Death	3.8.92			?
309	*	M	14.9.92	228	229	Junagadh	14.9.92 15.9.92	280	Birth Death	15.9.92			0
310	*	F	14.9.92	228	229	Junagadh	14.9.92 16.9.92	281	Birth Death	16.9.92			0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
311	*	F	17.9.92	228	260	Junagadh	17.9.92 20.9.92	282	Birth Death	 20.9.92			0
312	*	M	12.10.92	228	261	Junagadh	12.10.92 14.10.92	283	Birth Death	 14.10.92			0
313	*	F	12.1.92	228	261	Junagadh	12.10.92 17.10.92	284	Birth Death	 17.10.92			0
314	*	F	12.10.92	228	261	Junagadh	12.10.92 25.10.92	285	Birth Death	 25.10.92			0
315	*	F	12.1.92	228	261	JUnagadh	12.10.92 31.10.92	286	Birth Death	 31.10.92			0
316	Parth	M	27.10.92	78	101	Rajkot	27.10.92	Unk	Birth				0.125
317	Bansi	F	27.10.92	78	101	Rajkot	27.10.92	Unk	Birth				0.125
318	Devid	M	8.11.92	228	259	Junagadh	8.11.92 10.12.92	287	Birth Death	 10.12.92			0
319	John	M	8.11.92	228	259	Junagadh	8.11.92	288	Birth				0
320	Maria	F	8.11.92	228	229	Junagadh	8.11.92	289	Birth				0
321	Penny	F	8.11.92	228	259	Junagadh	8.11.92 7.12.93	290	Birth Death	 7.12.93			0
322	Abhishek	M	*	Wild	Wild	Gir Sanctuary Junagadh	1993	Unk 291	Capture Transfer		FA	DNB	0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
323	*	M	*	Wild	Wild	Gir Sanctuary Junagadh	25.7.93 25.7.93 9.11.94	Unk 292	Capture Transfer Death	9.11.94	FA	DNB	0
324	Kamala	F	*	Wild	Wild	Gir Sanctuary	13.2.94 13.2.94	Unk 293	Capture Transfer		FA	DNB	0
325	Hemraj	M	*	Wild	Wild	Gir Sanctuary	31.5.94 31.5.94	Unk 294	Capture Transfer		FA	23	0
326	Rekha	F	21.9.94	108	122	Hyderabad	21.9.94 15.4.96	10 AL-0010	Birth Death	15.4.96			0.0625
327	Rakhi	F	21.9.94	108	122	Hyderabad	21.9.94 9.5.96	11 AL-0011	Birth Death	9.5.96			0.0625
328	*	M	8.12.94	264	266	V.J.B.U.	8.11.94 12.12.94	*	Birth Death	12.12.94			0
329	*	F	18.12.94	325	261	Junagadh	18.12.94 29.12.94	295	Birth Death	29.12.94			0
330	*	F	18.12.94	325	261	Junagadh	18.12.94 20.1.95	296	Birth Death	20.1.95			0
331	Kanchan	F	18.12.94	325	261	Junagadh	18.12.94	297	Birth				0
332	Radhika	F	25.2.95	325	260	Junagadh	25.2.95	298	Birth				0
333	Anita	F	25.2.95	325	260	Junagadh	25.2.95	299	Birth				0
334	Akash	M	*	Wild	Wild	Gir Sanctuary Junagadh Hyderabad	28.3.95 28.3.95 29.11.98	Unk 300	Capture Transfer Transfer		FA	DNB	0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
335	Avani	F	16.4.95	325	259	Junagadh Hyderabad	16.4.95 29.11.98	301	Birth Transfer				0
336	Dharati	F	16.4.95	325	259	Junagadh	16.4.95	302	Birth				0
337	*	M	17.4.95	325	229	Junagadh	17.4.95 6.5.95	303	Birth Death	6.5.95			0
338	*	F	17.4.95	325	226	Junagadh	17.4.95 22.4.95	304	Birth Death	22.4.95			0
339	Jay	M	3.5.95	264	266	V.J.B.U.	3.5.95 1.2.96	*	Birth Death	1.12.96			0
340	Vijay	M	3.5.95	264	266	V.J.B.U.	3.5.95 28.3.97	*	Birth Death	28.3.97			0
341	Monica	F	3.5.95	264	266	V.J.B.U.	3.5.95 30.11.97	*	Birth Death	30.11.97			0
342	Ashok	M	21.5.95	Wild	Wild	Gir Sanctuary Junagadh	21.5.95 21.5.95 9.7.96	Unk 305	Capture Transfer Death	 9.7.96	FA	DNB	0
343	*	M	3.6.95	325	289	Junagadh	3.6.95 8.6.95	306	Birth Death	8.6.95			0
344	Garry	M	3.6.95	325	289	Junagadh	3.6.95 9.2.98	307	Birth Death	9.2.98			0
345	*	M	3.6.95	325	289	Junagadh	3.6.95 3.6.95	308	Birth Death	3.6.95			0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
346	*	M	12.6.95	325	268	Junagadh	12.6.95	309	Birth				0
							8.7.95		Death	8.7.95			
347	Vijay	M	12.6.95	325	268	Junagadh	12.6.95	310	Birth				0
							9.5.97		Death	9.5.97			
348	Ekta	F	12.6.95	325	268	Junagadh	12.6.95	311	Birth				0
						Ahmedabad	12.2.99		Transfer				
349	Ami	F	12.6.95	325	268	Junagadh	12.6.95	312	Birth				0
350	Pachan	M	22.8.95	164	166	Madras	22.8.95	*	Birth				0.125
351	Durga	F	22.8.95	164	166	Madras	22.8.95	*	Birth				0.125
352	Reena	F	22.8.95	164	166	Madras	22.8.95	*	Birth				0.125
353	Reeta	F	22.8.95	164	166	Madras	22.8.95	*	Birth				0.125
354	Urmila	F	20.9.95	150	210	Shimoga	20.9.95	Unk	Birth				0.07031
355	Hansraj	M	14.11.95	325	261	Junagadh	14.11.95	313	Birth				0
						Hyderabad	29.11.98		Transfer				
356	Gurjari	F	14.11.95	325	261	Junagadh	14.11.95	314	Birth				0
						Hyderabad	29.11.98		Transfer				
357	Rajvanti	F	14.11.95	325	261	Junagadh	14.11.95	315	Birth				0
358	*	M	21.3.96	342	289	Junagadh	21.3.96	316	Birth				0
							7.4.96		Death	7.4.96			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
359	Simba	M	21.3.96	342	289	Junagadh	21.3.96	317	Birth				0
360	Mufasa	M	21.3.96	342	289	Junagadh	21.3.96	318	Birth				0
						Ahmedabad	12.2.99		Transfer				
361	*	F	21.3.96	342	289	Junagadh	21.3.96	319	Birth				0
							24.3.96		Death	24.3.96			
362	*	F	21.3.96	342	289	Junagadh	21.3.96	320	Birth				0
							24.3.96		Death	24.3.96			
363	Seeta	F	1.4.96	264	266	V.J.B.U.	1.4.96	*	Birth				0
							22.9.96		Death	22.9.96			
364	Geeta	F	1.4.96	264	266	V.J.B.U.	1.4.96	*	Birth				0
							29.1.97		Death	29.1.97			
365	Silky	F	25.4.96	300	267	Junagadh	25.4.96	321	Birth				0
366	*	M	20.5.96	342	229	Junagadh	20.5.96	322	Birth				0
							22.5.96		Death	22.5.96			
367	Ashwini	F	20.5.96	342	229	Junagadh	20.5.96	323	Birth				0
368	Sham	M	21.3.96	108	122	Hyderabad	21.3.96	AL-0012	Birth				0.0625
							18.3.97		Death	18.3.97			
369	Sandeep	M	21.3.96	108	122	Hyderabad	21.3.96	AL-0013	Birth				0.0625
							25.10.97		Death	25.10.97			
370	Siddharth	M	21.3.96	108	122	Hyderabad	21.3.96	AL-0014	Birth				0.0625

1	2	3	4	5	6	7	8	9	10	11	12	13	14
371		F	31.8.96	300	267	Junagadh	31.8.96 31.8.96	324	Birth Death	 31.8.96			0
372		F	12.9.96	325	260	Junagadh	12.9.96 20.9.96	325	Birth Death	 20.9.96			0
373		U	17.9.96	325	259	Junagadh	17.9.96 18.9.96	326	Birth Death	 18.9.96			0
374		M	26.1.97	334	270	Junagadh	26.1.97 5.8.98	327	Birth Death	 5.8.98			0
375		F	26.1.97	334	270	Junagadh	26.1.97 5.2.97	328	Birth Death	 5.2.97			0
376		F	26.1.97	334	270	Junagadh	26.1.97 12.2.97	329	Birth Death	 12.2.97			0
377	Mayuri	F	26.1.97	334	270	Junagadh	26.1.97	330	Birth				0
378		M	30.1.97	325	260	Junagadh	30.1.97 28.3.97	331	Birth Death	 28.3.97			0
379		F	30.1.97	325	260	Junagadh	30.1.97 3.3.97	332	Birth Death	 3.3.97			0
380	*	M	14.2.97	300	267	Junagadh	14.2.97 3.3.97	333	Birth Death	3.3.97 3.3.97			0
381	Rani	F	14.2.97	300	267	Junagadh	14.2.97	334	Birth				0
382	Uma	F	21.3.97	108	125	Nehru Zoological Park	21.3.97	AL-0015	Birth				0.0332

1	2	3	4	5	6	7	8	9	10	11	12	13	14
383	Chandani	F	21.3.97	108	125	N.Z.P.H.	21.3.97	AL-0016	Birth				0.0332
384	Gauri	F	21.3.97	108	125	N.Z.P.H.	21.3.97	AL-0017	Birth				0.0332
385	Sankar	M	21.3.97	108	125	N.Z.P.H.	21.3.97	AL-0018	Birth				0.0332
386	*	M	19.4.97	334	241	Junagadh	19.4.97	335	Birth				0
							19.4.97		Death	19.4.97			
387	*	M	19.4.97	334	241	Junagadh	19.4.97	0	Birth				0
							19.4.97		Death	19.4.97			
388	*	M	19.4.97	334	241	Junagadh	19.4.97	337	Birth				0
							19.4.97		Death	19.4.97			
389	*	M	1.5.97	334	246	Junagadh	1.5.97	338	Birth	1.5.97			0
							1.5.97		Death	1.5.97			
390	*	F	1.5.97	334	246	Junagadh	1.5.97	339	Birth	1.5.97			0
							1.5.97		Death	1.5.97			
391	*	M	1.5.97	334	246	Junagadh	1.5.97	340	Birth	1.5.97			0
							4.5.97		Death	4.5.97			
392	*	M	1.5.97	334	246	Junagadh	1.5.97	341	Birth	1.5.97			0
393	Rohit	M	27.7.97	325	260	Junagadh	27.7.97	342	Birth				0
394	*	U	20.9.97	334	246	Junagadh	20.9.97	343	Birth				0
							20.9.97		Death	20.9.97			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
395	*	U	20.9.97	334	246	Junagadh	20.9.97	334	Birth				0
							22.9.97		Death	22.9.97			
396	*	F	20.9.97	334	246	Junagadh	20.9.97	345	Birth				0
							24.9.97		Death	24.9.97			
397	*	M	18.10.97	325	324	Junagadh	18.10.97	346	Birth				0
							18.10.97		Death	18.10.97			
398	*	M	18.10.97	319	299	Junagadh	18.10.97	347	Birth				0
							19.10.97		Death	19.10.97			
399	*	F	18.10.97	319	299	JUnagadh	18.10.97	348	Birth				0
							20.10.97		Death	20.10.97			
400	Jogi	M	16.11.97	Wild	Wild	Gir Sanctuary	16.11.97		Capture		FA	DNB	0
							16.11.97	364	Transfer				
401	*	M	18.12.97	Wild	Wild	Gir Sanctuary	18.12.97		Capture		FA	DNB	0
							18.12.97		Transfer				
							20.12.97		Death	20.12.97			
402	*	F	28.1.98	334	241	Junagadh	28.1.98	349	Birth				0
							28.1.98		Death	28.1.98			
403	*	F	28.1.98	334	241	Junagadh	28.1.98	350	Birth				0
							28.1.98		Death	28.1.98			
404	*	M	28.1.98	334	241	Junagadh	28.1.98	351	Birth				0
							29.1.98		Death	29.1.98			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
405	*	F	28.1.98	334	241	Junagadh	28.1.98 31.1.98	352	Birth Death	 31.1.98			0
406	*	M	28.3.98	334	246	Junagadh	28.3.98 28.3.98	353	Birth Death	 28.3.98			0
407	Lav	M	28.3.98	334	246	Junagadh	28.3.98	354	Birth				0
408	Kush	M	28.3.98	334	246	Junagadh	28.3.98	355	Birth				0
409	Ami	F	28.3.98	334	246	Junagadh	28.3.98	256	Birth				0
410	Pami	F	28.3.98	334	246	Junagadh	28.3.98	357	Birth				0

LOCATION WISE LISTING OF ASIATIC LIONS IN INDIAN ZOOS

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event	Age
SAKKARBAUG ZOO — JUNAGADH										
102	Sangeeta	F	15.12.80	69	25	Junagadh	15.12.80	85	Birth	19
241	Rati	F	1.1.89	69	132	Junagadh	1.1.89	212	Birth	10
246	Chandra	F	3.4.89	78	76	Junagadh	3.4.89	217	Birth	10
269	Madhuri	F	9.6.90	87	132	Junagadh	9.6.90	240	Birth	9
270	Hema	F	9.6.90	87	132	Junagadh	9.6.90	241	Birth	9
289	Rukmani	F	14.7.91	87	132	Junagadh	14.7.91	260	Birth	8
290	Amitabh	M	10.8.91	87	109	Junagadh	10.8.91	261	Birth	8
319	John	M	8.11.92	228	259	Junagadh	8.11.92	288	Birth	7
320	Maria	F	8.11.92	228	259	Junagadh	8.11.92	289	Birth	7
259	Sukeshi	F	*	Wild	Wild	Gir Sanctuary Junagadh	8.2.90 28.2.90	Unk 230	Capture Transfer	–
260	Bijlee	F	*	Wild	Wild	Gir Sanctuary	28.2.90	Unk	Capture	–
322	Abhishek	M	*	Wild	Wild	Gir Sanctuary Junagadh	28.6.93 28.6.93	Unk 320	Capture Transfer	–
324	Kamala	F	*	Wild	Wild	Gir Sanctuary Junagadh	13.2.94 31.2.94	Unk 293	Capture Transfer	–
325	Hemraj	M	*	Wild	Wild	Gir Sanctuary Junagadh	31.5.94 31.5.94	Unk 294	Capture Transfer	–

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event	Age
331	Kanchan	F	18.12.94	325	261	Junagadh	18.12.94	297	Birth	5
332	Radhika	F	25.2.95	325	260	Junagadh	25.2.95	298	Birth	4
333	Anita	F	25.2.95	325	260	Junagadh	25.2.95	299	Birth	4
336	Dharati	F	16.4.95	325	259	Junagadh	16.4.96	302	Birth	4
357	Rajvanti	F	14.11.95	325	261	Junagadh	14.11.95	315	Birth	4
359	Simba	M	21.3.96	342	289	Junagadh	21.3.96	317	Birth	3
360	Mufasa	M	21.3.96	342	289	Junagadh	21.3.96	318	Birth	3
364	Silky	F	25.4.96	300	267	Junagadh	25.4.96	321	Birth	3
366	Ashwini	F	20.5.96	305	229	Junagadh	20.5.96	323	Birth	2
377	Mayuri	F	26.1.97	334	270	Junagadh	26.1.97	330	Birth	2
381	Rani	F	14.2.97	300	267	Junagadh	14.2.97	334	Birth	2
393	Rohit	M	27.7.97	325	260	Junagadh	27.7.97	342	Birth	2
400	Jogi	M	16.11.97	Wild	Wild	Gir Sanctuary	16.11.97 16.11.97		Capture Transfer	–
407	Lav	M	28.3.98	334	246	Junagadh	28.3.98	354	Birth	1
408	Kush	M	28.3.98	334	246	Junagadh	28.3.98	355	Birth	1
409	Ami	F	28.3.98	334	246	Junagadh	28.3.98	356	Birth	1
410	Pami	F	28.3.98	334	246	Junagadh	28.3.98	357	Birth	1

Sex Ratio — 10 : 21 (31)

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event	Age
GIR SAFARI PARK										
174	Sarika	F	29.9.85	99	75	Junagadh Gir Safari	29.9.85 11.12.87	150 Unk	Birth Transfer	14
183	Leena	F	30.1.86	99	21	Junagadh Gir Safari	30.1.86 20.5.88	156 Unk	Birth Transfer	13
184	Yogita	F	30.1.86	99	21	Junagadh Gir Safari	30.1.86 20.1.88	157 Unk	Birth Transfer	13
Sex Ratio — 0 : 3 (3)										
HILL GARDEN ZOO, KANKARIA AHMEDABAD										
234	Juhi	F	22.8.88	69	132	Junagadh Ahmedabad	22.8.88 28.4.93	205 Unk	Birth Transfer	11
348	Ekta	F	12.6.95	325	268	Junagadh Ahmedabad	12.6.95 12.2.9	311	Birth Transfer	4
360	Mufasa	M	21.3.96	342	289	Junagadh Ahmedabad	21.3.96 12.2.99	318	Birth Transfer	3
Sex Ratio — 1 : 2 (3)										
RAJKOT MUNICIPAL ZOO, RAJKOT										
101	Masihan	F	15.12.81	69	25	Junagadh	15.12.81	84	Birth	18
						Rajkot	24.1.92	Unk	Transfer	
100	Meena	F	26.11.81	69	77	Junagadh	26.11.81	83	Birth	18
						Rajkot	22.1.92	Unk	Transfer	
316	Parth	M	27.10.92	78	101	Rajkot	27.10.92	Unk	Birth	7
317	Bansi	F	27.10.92	78	101	Rajkot	27.10.92	Unk	Birth	7
Sex Ratio — 1 : 3 (4)										

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event	Age
VEERMATA JIJABAI BHOSLE UDHYAN, BYCULLA, BOMBAY										
266	Anita	F	*	Wild	Wild	Gir Sanctuary	1.3.90	Unk	Capture	
						Junagadh	1.3.90	237	Transfer	
						V.J.B.U.	19.3.91	Unk	Transfer	
139	Mithun	M	17.7.84	78	75	Junagadh	17.7.84	118	Birth	
						Pune	5.4.88	Unk	Transfer	
						V.J.B.U.	20.2.98		Transfer	
Sex Ratio — 1 : 1 (2)										
BANNERGHATA LION SAFARI, BANGALORE										
175	Sapna	F	29.9.85	99	75	Junagadh	29.9.85	151	Birth	14
						Bannerghata	19.12.89	Unk	Transfer	
176	Sonia	F	29.9.85	99	75	Junagadh	29.9.85	152	Birth	14
						Bannerghata	19.12.89	Unk	Transfer	
177	Rama	M	26.6.90	84	176	Bannerghata	26.6.90	Unk	Birth	9
Sex Ratio — 1 : 2 (3)										
SHRI CHAMARAJENDRA ZOOLOGICAL PARK, MYSORE										
178	Laxman	M	26.6.90	84	76	Bannerghata	26.6.90	Unk	Birth	9
						Mysore	18.8.95	*	Transfer	
179	Madhuri	F	26.6.90	84	176	Bannerghata	26.6.90	Unk	Birth	9
						Mysore	18.1.95		Transfer	
247	Vrunda	F	3.4.89	78	76	Junagadh	3.4.89	218	Birth	10
						Mysore	20.11.89	Unk	Transfer	
97	Manini	F	27.5.85	90	27	Nandankannan	27.5.85	Unk	Birth	14
						Mysore	6.12.96		Transfer	
Sex Ratio — 1 : 3 (4)										

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event	Age
SHIMOGA LION SAFARI, SHIMOGA, KARNATAKA										
203	Parul	F	20.7.86	99	65	Junagadh Shimoga	20.7.86 6.4.88	176 Unk	Birth Transfer	13
206	Priyanka	F	2.8.86.	99	100	Junagadh Shimoga	2.8.86 6.4.88	179 Unk	Birth Transfer	13
210	Jyoti	F	24.9.86	83	85	Junagadh Shimoga	24.9.86 6.4.88	183 Unk	Birth Transfer	13
212	Rashmi	F	30.11.93	150	210	Shimoga	30.11.93	Unk	Birth	6
354	Urmila	F	20.9.95	150	210	Shimoga	20.9.95	Unk	Birth	4
Sex Ratio — 0 : 5 (5)										
TRIVANDRUM ZOOLOGICAL GARDEN, TRIVANDRUM, KERALA										
52	Gauri	F	16.9.85	46	41	Trivandrum	16.9.85	Unk	Birth	14
53	Mani	M	23.12.86	46	41	Trivandrum	23.12.86	Unk	Birth	13
Sex Ratio — 1 : 1 (2)										
ARIGNAR ANNA ZOOLOGICAL PARK, MADRAS, TAMIL NADU										
104	Bhuvana	F	24.4.82	69	21	Junagadh Madras	24.4.82 27.9.89	87 Unk	Birth Transfer	17
164	Surya	M	8.10.90	163	162	Madras	8.10.90	Unk	Birth	9
166	Meena	F	8.10.90	163	162	Madras	8.10.90	Unk	Birth	9
350	Pachan	M	22.8.95	164	166	Madras	22.8.95	Unk	Birth	4
351	Durga	F	22.8.95	164	166	Madras	22.8.95	Unk	Birth	4

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event	Age
352	Reena	F	22.8.95	164	166	Madras	22.8.95	Unk	Birth	4
353	Rita	F	22.8.95	164	166	Madras	22.8.95	Unk	Birth	4
Sex Ratio — 2 : 5 (7)										
NEHRU ZOOLOGICAL PARK, HYDERABAD, A.P.										
108	Santosh	M	19.3.82	69	65	Junagadh Hyderabad	19.3.82 1.2.87	91 Unk	Birth Transfer	17
122	Shivani	F	12.5.83	69	21	Junagadh	12.5.83	105	Birth	16
267	Carol	F	*	Wild	Wild	Gir Sanctuary Junagadh Hyderabad	1.3.90 1.3.90 29.11.98	Unk 238	Capture Transfer Transfer	–
299	Jan	F	*	Wild	Wild	Gir Sanctuary Junagadh Hyderabad	16.12.91 16.12.91 29.11.98	Unk 270	Capture Transfer Transfer	–
334	Akash	M	*	Wild	Wild	Gir Sanctuary Junagadh Hyderabad	28.3.95 28.3.95 29.11.98	Unk 300	Capture Transfer Transfer	–
355	Hansraj	M	14.11.95	325	261	Junagadh Hyderabad	14.11.95 29.11.98	313	Birth Transfer	4
335	Avani	F	16.4.95	325	259	Junagadh Hyderabad	16.4.95 29.11.98	301	Birth Transfer	4
Sex Ratio — 3 : 4 (7)										
VANVIHAR NATIONAL PARK, BHOPAL, M.P.										
130	Rani/Gira	F	7.9.83	69	25	Junagadh Bhopal	7.9.83 28.9.86	109 Unk	Birth Transfer	16
Sex Ratio — 0 : 1 (1)										

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event	Age
PRICE OF WALES ZOOLOGICAL GARDEN, LUCKNOW, U.P.										
73	Heer	F	28.8.87	68	21	Junagadh		Birth		22
						Kanpur	Unk	Transfer		
						Lucknow	Unk	Transfer		
123	Jaggu	M	24.3.90	108	122	Hyderabad	24.3.90	Unk	Birth	9
						Lucknow	21.9.96	Transfer		
124	Nandini	F	13.4.93	108	122	Hyderabad	13.4.93	Unk	Birth	6
						Lucknow	21.9.96	Transfer		
126	Ashwini	F	13.4.03	108	122	Hyderabad	13.4.93	Unk	Birth	6
						Lucknow	21.9.96	Transfer		
Sex Ratio — 1 : 3 (4)										
ALIPORE ZOO, CALCUTTA, WEST BENGAL										
49	Sajiv	M	29.6.81	46	41	Trivandrum	29.6.81	Unk	Birth	18
						Calcutta	19.1.84	Unk	Transfer	
50	Ambili	F	29.6.81	46	41	Trivandrum	29.6.81	Unk	Birth	18
						Calcutta	19.1.84	Unk	Transfer	
Sex Ratio — 1 : 1 (2)										
NATIONAL ZOOLOGICAL PARK, DELHI										
252	Situ	F	10.4.89	Wild	244	Junagadh	10.4.89	223	Birth	10
						New Delhi	28.1.91	Unk	Transfer	
251	Ritu	F	10.4.89	Wild	244.	Junagadh	10.4.89	222	Birth	10
						New Delhi	28.1.91	Unk	Transfer	
Sex Ratio — 0 : 2 (2)										

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event	Age
KANPUR ZOOLOGICAL PARK, KANPUR										
229	Manda	F		Wild	Wild	Gir Sanctuary Junagadh Kanpur	10.7.88 10.7.88 15.11.98	Unk 200	Capture Transfer Transfer	
300	Paul	M	*	Wild	Wild	Gir Sanctuary Junagadh Kanpur	1.1.92 1.1.92 15.11.98	Unk 271	Capture Transfer Transfer	
356	Gurjari	F	14.11.95	325	261	Junagadh Kanpur	14.11.95 15.11.98	314	Birth	4
Sex Ratio — 1 : 2 (3)										

ZOOWISE LISTING OF WILD ASIATIC LIONS IN INDIAN ZOOS

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event
SAKKARBAUG ZOO — JUNAGADH									
259	Sukeshi	F	*	Wild	Wild	Gir Sanctuary	28.2.90	Unk	Capture
						Junagadh	28.2.90	230	Transfer
260	Bijlee	F	*	Wild	Wild	Gir Sanctuary	28.2.90	Unk	Capture
						Junagadh	28.2.90	231	Transfer
322	Abhishek	M	*	Wild	Wild	Gir Sanctuary	28.6.93	Unk	Capture
						Junagadh	28.6.93	320	Transfer
324	Kamala	F	*	Wild	Wild	Gir Sanctuary	13.2.94	Unk	Capture
						Junagadh	13.2.94	293	Transfer
325	Hemraj	M	*	Wild	Wild	Gir Sanctuary	31.5.94	Unk	Capture
						Junagadh	31.5.94	294	Transfer
400	Yogi	M	*	Wild	Wild	Gir Sanctuary	16.11.97	Unk	Capture
							16.11.97	634	Transfer
VEERMATA JIJABAI BHOSLE UDYAN, BYCULLA, BOMBAY									
266	Anita	F	*	Wild	Wild	Gir Sanctuary	1.3.90	Unk	Capture
						Junagadh	1.3.90	237	Transfer
						Veermata	19.3.91	Unk	Transfer
NEHRU ZOOLOGICAL PARK, HYDERABAD, A.P.									
267	Carol	F	*	Wild	Wild	Gir Sanctuary	1.3.90	Unk	Capture
						Junagadh	1.3.90	238	Transfer
						Hyderabad	29.11.98		Transfer
299	Jan	F	*	Wild	Wild	Gir Sanctuary	16.12.91	Unk	Capture
						Junagadh	16.12.91	270	Transfer
						Hyderabad	29.11.98		Transfer

Stud	Name	Sex	Birth date	Sire	Dam	Location	Date	Local ID	Event
334	Akash	M	*	Wild	Wild	Gir Sanctuary	28.3.95	Unk	Capture
						Junagadh	28.3.95	300	Transfer
						Hyderabad	29.11.98		Transfer
KANPUR ZOOLOGICAL PARK, KANPUR									
229	Manda	F	*	Wild	Wild	Gir Sanctuary	10.7.88	Unk	Capture
						Junagadh	10.7.88	200	Transfer
						Kanpur	15.11.98		Transfer
300	Paul	M	*	Wild	Wild	Gir Sanctuary	1.1.92	Unk	Capture
						Junagadh	1.1.92	271	Transfer
						Kanpur	15.11.98		Transfer

APPENDIX-I

POPULATION AND HABITAT VIABILITY ASSESSMENT WORKSHOP FOR ASIATIC LION (PANTHERA LEO PERSICA)

A PHVA Workshop for Asiatic lion (*Panthera leo persica*) was conducted by CBSG India, in collaboration with other institutions, from 18-21 October 1993 in Baroda. The **Executive Summary** of the workshop and report of the **Captive Working Group** is presented below.

EXECUTIVE SUMMARY

The Asiatic lion is a large predatory carnivore, which used to range over much of the Indian subcontinent and surrounding area. It is an animal whose size, strength and nobility have earned it identification with emperors and kings. It is an important cultural and historical symbol for India, having been selected as the emblem of the Government of India. The present status of the species is that it survives as a solitary, relatively small population of around 300 animals in a single relatively small area of 1400 square km. which is intensively managed. The behavioral and biological characteristics of the animal are such that it requires a large area to permit normal social interaction with its conspecifics as well as containment in a protected area away from human habitation.

The Asiatic lion has been of concern for many years as the population is said to have diminished to a scant twenty to one hundred or so animals. Previously, reintroduction and translocation efforts had been undertaken to try and establish another population but these efforts were not successful, due to lack of proper planning and methodology. Recent research has underscored the speculation that even the wild population may be suffering from inbreeding depression.

The Wildlife Institute of India and the Government of India have supported research to study the ecology of the Gir population and take up the matter of finding an alternative habitat for Asiatic lion. One of the major tasks of this Workshop being to pursue this initiative, the suitability of several sites for lion translocation were assessed on the basis of prey population and other habitat factors. They were ranked as follows in order of suitability : Kuno, Sitamata, Darrah-Jawahar Sagar, Kumbalgarh, Barda.

The Asiatic Lion Population and Habitat Viability Assessment workshop was conducted with different working groups in parallel sessions with plenary sessions for presentation, review, and integration of the individual reports. Written draft reports prepared by all the working groups form the body of this report.

Individual working groups were :

1. Habitat (Gujarat, Madhya Pradesh and Rajasthan sub-groups)
2. Prey-Base Requirements
3. Population Modelling
4. Translocation
5. Monitoring and Research
6. Lion-Human Interactions
7. Captive Population
8. Diseases and Veterinary research
9. Reproductive and Genetics Research
10. Eco-development
11. Public Education

The three habitat sub-groups assessed the suitability of the following sites : Barda (Gujarat), Sitamata, Darrah-Jawahar Sagar, Kumbalgarh (Rajasthan) and Kuno (Madhya Pradesh); for lion translocation using II parameters. The sites were assessed on the basis of prey populations, both including and excluding livestock by the **Prey Base Requirements Group**.

The proposed translocation sites were ranked as follows for suitability as a habitat for lions, based upon a synthesis of the results of the above working groups :

1. Kuno
2. Sitamata
3. Darrah-Jawahar Sagar

4. Kumbalgarh

5. Barda

The **Population Modelling Group** confirmed through computer simulations that growth rates and probability of extinction were closely linked to age of female first reproduction and first year mortality rates which are strongly influenced by habitat and prey availability. In addition, the viability of the population depends on the carrying capacity of the Gir forest stabilizing at a range between 200-250 animals. It was further established that significant reductions and changes in the size and structure of the population due to a catastrophic disease-event would be devastating. The modelling exercise provided statistical indicators that establishment of a second population will reduce the risk of extinction of the Asiatic lion significantly. It could be demonstrated also by the modelling exercise that the existing population will not be harmed by the removal of sufficient animals to translocate to the alternative site.

The **Translocation Group** has delineated a methodology to be followed for release of the lions, according to Guidelines of the IUCN/SSC Reintroduction Specialist Group. This includes genetic and demographic selection of stock, veterinary screening, research, monitoring, training and education- eco-developmental activity for Pre-translocation phase, Planning, preparation and release phase, and Post-release phase.

The **Monitoring and Research Group** has stressed the need for constant monitoring of the lion population in Gir and also at the site(s) where lions are to be translocated. Maintaining long-term records and intensively studying the numerous lion groups using radio telemetry and recommended. The Workshop participants as a group felt the need for a continuous research programme with a permanent research base in Gir. Research on prey species, other carnivores like leopard and striped hyena, and animal-habit relationships have also been recommended.

The **Lion-Human Interactions Group** considered all the possible types (interaction between lions and human beings, (including the Maldharis and villagers who live inside the protected area as well as villagers in the border area outside the P.A. and analyzed the circumstances and consequences of such interactions, the need for population management of lions outside the Gir forest has been stressed, as well relocation of the Maldharis from the Gir protected area. Recent studies of case-by-case physical interaction underscore the need for an innovative education and awareness programme for the people living adjacent to the forest boundary.

The **Captive Population Group** has very clearly outlined the objectives of the captive breeding programme and also has fixed a regional limit on the number of lions that can be held in captivity. Maintaining the purity of the stock of Asiatic lions and retaining the maximum amount of genetic diversity are amongst the major goals identified. This would involve facilitating the integration of wild caught problem lions outside the Gir Forest in captive breeding programmes. All lions would have transponders implanted in them to enable definite identification. A detailed protocol for breeding and husbandry of the lions has also been provided.

The **Disease and Veterinary Research** Group has compiled a comprehensive list of all diseases reported from captive and free ranging lions and identified areas which need research attention. Some of the surveys for diseases and parasites assume great importance and immediate relevance as these are currently the major threats facing the lions in Gir forest.

The **Reproductive and Genetic Research Group** has summarized the information available on the reproductive biology of Asiatic lions and identified subjects that need research attention. Detailed outlines and justification have been provided for the proposed research. Emphasis has been placed on the need for setting up a Genome Resource Bank (ORB) within India for insuring the preservation of genetic diversity. Developing artificial insemination techniques as part of the suggested research programmes was also suggested. The group highlighted the urgent need to systematically sample the free-ranging lion population to assess the genetic diversity in the population. A few genetic management strategies are suggested, especially for the captive population.

The **Eco-development Group** looked at a wide variety of possible initiatives which could give a better life for the people living in and around the Gir forest and at the same time reduce their dependence on the natural resources of this tract. These included grass fodder development, soil-moisture conservation measures, energy-related activities, employment generation activities, regular programme of immunization of livestock, provision of separate water troughs for livestock, relocation of Maldharis and eco-tourism.

The **Public Education Group** stressed the need to educate at large on general conservation values and endangered species in particular. Various strategies have been outlined to achieve this, such as educating village leaders, recognition, motivation and training of individuals and organizations presently doing effective awareness work and identification of most effective media for imparting nature education to different target groups in order to provide them with attractive and accurate baseline information.

The overwhelming consensus of the workshop was that an alternative habitat for the Asiatic lion must be established with all possible speed, but without compromise of the accepted strategies and principles governing systematic and scientific reintroduction. This should be done simultaneously with strengthening effective protection and management of the Gir Forest and assuring the viability of the captive population and alternative genetic resources.

REPORT OF THE CAPTIVE WORKING GROUP : GLOBAL CAPTIVE POPULATION ACTION PLAN

The reason for establishing a captive population of Asiatic Lions is to further ensure the long-term security of the sub-species. This scientifically managed breeding programme is facilitated by a regional captive population coordinator or committee, whose job is to maintain a geneticallypure, non-inbred population in tandem with the coordinators in other zoo regions.

It is the responsibility of the coordinating bodies to make breeding recommendations to equalize founder representation and family sizes. This would avoid individual lion producing more offspring than is required to maintain the level of heterozygosity, or, would overstretch the amount of captive space that is available for the population.

Occasionally, wild caught individuals will be available from the wild population to enhance the captive population. Generally these will be displaced or 'problem' animals that have to be removed from outside the periphery of the sub-species range. Any 'harvesting' has to be held at or below a recognized level (from the demographic simulation models) that does not compromise the long-term security of the wild population.

Currently the pure captive population of Asiatic Lion is estimated to be 82 specimens of which 59 (19.34.6) are in India and 23 (11.10.2) outside of India.

Recommendations

1. To develop a genetically pure, healthy captive population of between 400 to 600 animals. Regional coordinators will be established to manage the population in the five global zoo regions with a proposed minimum distribution as follows :

		Target population
(i)	India	200-300
(ii)	South-east Asia	25-50
(iii)	Australia	25-50
(iv)	Europe	75-100
(v)	North America	75-100

   Other regions may participate in this programme should they fulfill the requirements stated in this document.

2. Hybridization has seriously affected the integrity of the captive population of the Asiatic lion in the past. Therefore the zoological community will identify the genetically pure lions and permanently identify those individuals. The use of transponders at the dorsal base of the tail and tattooing on the inner right thigh shall be done by each zoological institution housing these animals. Studbook numbers should be used for identification whenever possible.

3. Genetically pure individuals will only be housed at institutions that can prevent hybridization. It will be preferable that these animals be kept in facilities which have no hybrid lions. However, if all the hybrids cannot be removed, each individual hybrid lion shall be sterilized before allowing the facility to be a member of the captive breeding programme.

4. All of the zoological institutions participating in the programme will abide by the recommendations of their Regional Species Coordinators.

5. Regional species Studbook Keepers will be responsible for collecting and maintaining a current regional studbook. This information shall be provided annually to the International Studbook Keeper.

6. Ownership of all Asiatic lions shall be retained by the Government of India. There will be no commercial transaction of Asiatic lions.

POPULATION MANAGEMENT AND HUSBANDRY

Facilities

A major component for the care and management of the captive lion is the design of the facility in which the animal is housed. When designing the enclosure, husbandry needs, veterinary concerns and the biological requirements of the animal should be considered and incorporated in the facility. Important considerations when designing a breeding facility should include : dimensions, barriers, substrate, shelter, transfer areas, and climate which can affect both the reproduction and health of the animal.

Design

The basic enclosure design is of utmost importance. The size must be adequate for movement and exercise to decrease boredom, stimulate activity, and give the lion a feeding of security and comfort.

1. Barriers commonly used for containment include :

   (a) Bars- metal can provide strength and requires relatively low maintenance. However these may promote trauma from biting or attacking, may trap limbs or heads due to inadequate spacing, and may promote trauma from adjacent cats due to improper design barriers.

   (b) Wire - is acceptable for lion enclosures provided it is of adequate strength. This material if not properly selected and installed may trap limbs, heads or teeth, especially in young animals.

   (c) Glass - requires more maintenance, is expensive, and is vulnerable to fracture. The material used should be of adequate strength to restrict any damage that could be caused by the animal or outside forces.

(d) Moats and Grottos - should be constructed of sufficient area both horizontally and vertically (minimum 15' deep and 25' across) to prevent escape. Deep vertical or water filled moats, although effective should not be used to contain infants or in situations where interspecies aggression is high. Extra consideration should be given in zoos where water moats are subject to freezing over.

2. Shelter/holding area(s) - must be provided for each animal in the enclosure. Protection from the elements should be accessible. A sheltered area which does not exceed 85 degrees Fahrenheit, minimal heat provision for those institutions located in colder climates should be provided.

3. Indoor areas - should be illuminated by a combination of natural and artificial light. Proper ventilation is imperative for indoor facilities.

EXHIBIT ENCLOSURE

Naturalistic exhibits - may be created by using vegetation and soil. Natural substrates for the outdoor enclosure arepreferred. Grasses and other plant materials used within an enclosure must be carefully chosen to avoid toxic species.

Dirt substrates will become contaminated overtime with micro-organisms and parasites, exposing the animals to potentially dangerous concentrations of pathogens. Provisions must be made so that the contaminated substrate is removed periodically and replaced with clean materials.

The topography of the exhibit should be varied with a combination of elevated areas, dead fall trees, rocks and mounds. Logs or timbers allow the natural behavior of scratching for claw wear and maintenance.

Natural hiding areas should be included in the exhibit. There should be adequate shade provided in the exhibit for the animals. Ponds, pools or streams add to the exhibit, but water sources must be drained if cubs are to be displayed in the area.

This area should be sub-divided into a main exhibit/breeding area and holding yards for animals temporarily isolated/separated from the main exhibit.

The aquatic component of exhibits, pools and moats, need to be designed for maintaining high water quality, ease of cleaning and sanitizing due to the tendency of some cats to defecate in water.

OFF-EXHIBIT HOLDING

Off-exhibit holding enclosure's are essential to proper management and health care of the animals and including additional working, holding and quarantine areas. Off-exhibit holding provides treatment areas out of public view and seclusion for a stressed or ill lion. Within this area, squeeze or restraint cages permit an alternative method of handling for procedures normally necessitating anaesthesia.

Off-exhibit enclosures should provide access to a private outdoor area and a dry, comfortable, denning space. These areas should be designed to facilitate feeding, watering, and cleaning with as little disturbance as possible. Surfaces in these areas must provide good traction, especially when wet, but not be so abrasive as to cause foot pad trauma during normal movement or pacing.

MATERNITY DEN

Off-exhibit areas can also provide an area where a female can be isolated from cagemates prior to parturition. This is an essential component to successful birthing and survivalship of cubs.

A pregnant female should be separated prior to parturition. A separation date should be determined utilizing the date of breeding, temperament of female, and past birthing history. Females with cubs should be kept separate from other adults until the cubs reach an age of two to three months. Adult lions of both sexes will tolerate cubs if adequate space is provided.

Examination of cubs after birth will depend upon the disposition of the female. Guidelines in the veterinarian section of the proceedings may be referred to.

SOCIAL ORGANIZATION

Lions are solitary animals for at least part of their life, therefore they may be housed singularly or in groups depending on compatibility and enclosure space. Only one male should be mixed with a female, or group of females at any one time to ensure accurate recording of parentage.

It may be possible for a number of single sex groups to be established, particularly in safari parks. These can be groups that have already produced the required progeny in the captive population. These groups will act as a reservoir that can be utilized, should a particular individual be needed in the breeding population.

ENCLOSURE MAINTENANCE

Each enclosure design must provide an easy to clean water container that can be shut of and drained. The water container should be accessible to both lion and keeper.

Disinfecting agents must be selected on the basis of effectiveness and low toxicity. For effective cleaning, hot water, a detergent plus physical effort is needed to remove organic debris, followed by disinfectant. In all cases chemicals must be thoroughly rinsed to prevent animal exposure.

INTRODUCTION

Introduction methodology varies with each institution. Flexibility is the key to successful introductions. Individual personalities and animal characteristics must be considered.

For any introduction, adequate staff should be available to intervene, keeping in mind that aggression may occur. Methods for intervention and separation could include the transferring of animal(s) to another enclosure, the use of safety equipment (e.g. Broomsticks, rakes) water spray or CO_2 canister. All introductions should be carefully monitored and should be limited to hours when staff is available.

MATE SELECTION

Mate selection is an important factor. Consideration should be given to genetic representation of individuals all transfers and breeding should be recommended/approved by the regional Asiatic lion coordinator.

APPENDIX-II

PLANNED BREEDING OF ASIATIC LIONS

Traditionally studbooks have been used as an aid to stock improvement by facilitating selective breeding. Each registered specimen is awarded a breeding value, which is an indication of the extent to which a desired trait is represented in the individual concerned.

A typical studbook provides a list of all specimens registered (both living and dead) their sexes, dates of birth, parentage, locations and where appropriate dates and places of death. The most important function of a studbook is its role in preventing inadvertent inbreeding and in facilitating the design of breeding programmes which preserve genetic diversity.

The need for having a planned breeding programme for Asiatic lion in Indian zoos was felt for long. However due to absence of a proper studbook of the species the same could not be initiated. It was in view of the importance of studbooks, that the Asiatic lion studbook was compiled and published by the Central Zoo Authority in the year 1995. A meeting to initiate a planned breeding programme for Asiatic lion was held at Sasan Gir (Gujrat) on 4.5.1995. The decisions arrived at during the course of this meeting were :

1. A minimum of twenty number of founders (10 males and 10 females) will be required for initiating the programme. Breeding of the species is to be done in such a manner that all the founder contribute equally in every generation. For species like Asiatic lion a population of about 150 animals is considered genetically viable. However keeping in view the possibility of new founder animals coming into the programme from time to time by way of capture of man eaters and cattle lifters, a population size of even 100 animals may be considered good enough. The target population can be achieved in three generations.

2. As the possibility of several males being a-spermatic, or sperms not having adequate motility due to broken tails etc. cannot be ruled out. Therefore detailed sperm testing will have to be carried out before taking any male lion into the planned breeding programme.

3. As an interim measure it was decided to retain two of the founder males with Junagadh and send the third to Arignar Anna Zoological Park (Chennai). The remaining three sub-adult founder males alongwith three females were to be sent to Kamala Nehru Zoological Park, Ahmedabad, Kanpur Zoo, Kanpur and Vanvihar National Park, Bhopal in pairs subject to condition that exclusive enclosures for the breeding programme is provided by the zoos.

4. A committee comprising of representatives from Central Zoo Authority, Forest Dept. Sakkarbaug Zoo, Junagadh will visit the identified zoo and inspect facilities in respect of the upkeep and health care available, before the movement of animals.

5. Each identified zoo will make provisions for maintenance of proper records like animal history sheets, treatment cards and studbooks.

As a follow up of these decisions, animals have now been moved to Kamala Nehru Zoological Park, Ahmedabad and Kanpur Zoo, Kanpur. The movement of animals to other assigned zoos has not yet taken place. Two other zoos were identified later for the planned breeding programme. They are National Zoological Park, Delhi and Nehru Zoological Park, Hyderabad. The Zoo Officer, Sakkarbaug Zoo, who is the studbook keeper, is required to expedite action in consulation with the zoos.

The details of animals moved to identified zoos are as given below :

Sl.No.	Name of the Zoo	Name of the Animal	Sex	Stud No.
1.	Kamala Nehru Zoological Park, Ahmedabad	Ekta	F	348
		Mufasa	M	360
2.	Kanpur Zoo, Kanpur	Manda	F	229
		Paul	M	300
		Gurjari	F	356
3.	Nehru Zoological Park, Hyderabad	Carol	F	267
		Jan	F	299
		Akash	M	334
		Hansraj	M	355
		Avani	F	335
4.	National Zoological Park, Delhi	Luv	M	407
		John	M	319
		Anita	F	333

APPENDIX-III

MOLECULAR CHARACTERIZATION OF WILD ANIMALS BY DNA FINGERPRINTING FOR THEIR BETTER MANAGEMENT IN INDIAN ZOOLOGICAL GARDENS

This study was conducted by Dr. Lalji Singh of Center for Cellular and Molecular Biology, Hyderabad.

1. **DNA Fingerprinting :** Multilocus fingerprinting with Bkm 2 (8) probe was performed using several restriction enzymes (Hin f1, Taq 1, BstN 1, Hae III, Mbo 1. No polymorphism was detected in the Asiatic lion populations studied. An average heterozygosity of 28% was observed.

2. **RAPD Analysis :** RAPD patterns were assessed in Asiatic lions. A total of 38 Asiatic lions from Sakkarbaug zoo were analyzed and an average heterozygosity of 25.82% was observed. The heterozygosities ranged from 16.71% to 34.39% for individual primers.

3. **Microsatellite Analysis :** Microsatellite analysis was carried out on five CA repeat loci, which are polymorphic in the felids. Lions from the Sakkarbaug zoo, which are considered pure Asiatic lions as per the International Studbook, did not show any variation at all at the five microsatellite loci analyzed. Asiatic lions were monomorphic and homozygous at these loci, the hybrid lions were polymorphic and the alleles did not match with those found in Asiatic lions. These alleles are probably the contribution from African lions to their genome. Analysis at these loci was also able to confirm that two Asiatic lions in Bhuvaneshwar zoo were indeed pure Asiatic lions.

4. **Mitochondrial 'D' Loop Sequence Analysis :** The D loop region of the mitochondrial DNA consists of stretches of repetitive DNA, which are highly variable the repetitive stretch between Control Sequence Block (CSB) 1 and CSB 2 is composed of simple sequence motifs which are arranged in a species specific manner. Only one haplotype was observed in the Asiatic lions, while, hybrid lions showed extensive sequence variation. Average pair wise nucleotide divergence of 9% was observed between Asiatic and African lions.

5. **Immune Diversity :** MHC class 1 locus, which plays an important role in the immune system was sequenced to determine the genetic variability. Abundant polymorphisms and heterozygosity was observed in the Asiatic lions. This data suggests that these species possess significant amounts of immune diversity comparable to any other wild animal, contrary to earlier reports.

6. **Findings :** The Asiatic lions and Indian tigers are not as inbred as previously reported by S.J.O. Brien and group from USA and do not suffer from inbreeding depression. The Asiatic lions exhibit a moderate genetic variability of about 26%. The immune locus data reveals that the Asiatic lions reveal abundant immune diversity. Analysis of reproductive parameters by Dr. Shivaji from C.C.M.B. also does not reveal any significant differences in the incidence of sperm abnormalities and circulating testosterone levels as compared to other wild animals. These data collated provided evidence that Asiatic lions do not suffer from inbreeding depression low genetic variability is not due to any recent bottlenecks but has been an inherent feature of these species. Asiatic lions Madhuri (1256), Chandra (1188), Hemlatha (1237) and Hadara from the Sakkarbaug zoo possess high amounts of genetic variation. These animals can especially be used for further breeding to improve the genetic diversity of the Asiatic lion population. Using microsatellite and mitochondrial sequence analysis it was confirmed that the two Asiatic lions in the Bhubaneswar zoo are pure Asiatic lions. All lions from the Sakkarbaug zoo are also pure Asiatic lions as designated by the International studbook. The lions in all other zoos were found to be hybrids. The microsatellite analysis at loci Fac 77 and Fac 126 is able to differentiate pure Asiatic lions from hybrid lions. The Asiatic lions do not exhibit any polymorphism at these loci, while hybrid exhibit extensive variability. This variability could be due to the contribution of African alleles into the population. The mitochondrial D loop sequence analysis also confirms this point. Asiatic lions do not exhibit any variation, while the hybrids show extensive variability.

7. **Recommendations :** All the lions of Sakkarbaug zoo, lion numbers 304, 1017 from Bhubaneswar zoo and lions numbered 313, 319 from Hyderabad zoo are pure Asiatic lions. Lions from all other zoos tested were found to be hybrids between Asiatic and African lions. According to the RAPD data, Madhuri (1256), Chandra (1188), Hemalatha (1237) and Hadara posses high degree of variability. In Asiatic lions, the above mentioned animals should be in the founding population along with other animals caught from the Gir forest. The introduction of such wild animals can improve the stock of the zoo population. The zoo population of Asiatic lions should preferably split up into sub populations in two of three zoos. After a few generations, mixing between these populations can be performed. Each zoo should be set up a founder population and breeding programme. Transfer between zoo populations should be performed to maintain heterogeneity.