

# National Studbook for the Greater One-Horned Rhinoceros (*Rhinoceros unicornis*)

Data Current Till : 30<sup>th</sup> September, 2002

Published in : November, 2003

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**भारतीय वन्यजीव संस्थान**  
**Wildlife Institute of India**

FINANCIAL SUPPORT



**केन्द्रीय चिड़ियाघर प्राधिकरण**  
**Central Zoo Authority**

(Statutory Body Under the Ministry of Environment and Forests, Govt. of India)

### ACKNOWLEDGEMENTS

Our first and foremost thanks go to the Central Zoo Authority, for giving WII the task of compiling the studbooks for five endangered species. We also thank Shri P.R Sinha, Member Secretary and Shri. Bipul Chakraborty, Scientist, Central Zoo Authority, for their valuable assistance and guidance throughout the duration of this project.

We are most obliged to all the zoo directors and other zoo staff who provided us with all cooperation and assistance in compiling the data.

We are thankful to Dr. Goutam Narayan, Pygmy Hog Breeding Centre, Guwahati for sending us the SPARKS software and to ISIS for all the assistance in this regard.

Last but not the least, we extend our sincere gratitude to Ms. Laurie Bingaman Lackey, International Species Information System, who helped a lot with the data analyses.

We are grateful to the Director, Wildlife Institute of India, Dehradun, for giving us an opportunity to be part of such a vital endeavour.

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### Species status in the wild:

The greater one-horned rhinoceros (*Rhinoceros unicornis*), is listed as one of the world's most endangered species of mega-herbivore.

This species once found in large numbers throughout the the Indo-Gangetic plains and Brahmaputra valley of the Indian sub-continent (Laurie,1978), now exists as a few small population units situated on the northern border of eastern India and Nepal. The Rhino occurs in the following areas:

India: Manas, Kaziranga, Orang, Pabitora, Jaldapara, Gorumara, Dudhwa, Katerniaghat  
Nepal: Royal Bardia, Royal Chitwan; Pakistan: Lal Sohanra (Foose & Strien, 1997).

The latest population estimates are given in **Table.A** given below :

**Table. A: Wild Population Estimates for Greater One-horned Rhinoceros**

	<b>Global Captive Population *2000 Estimate</b>	<b>Subspecies Wild Population *2000 Estimate</b>
One-horned rhinoceros	139	~ 2,400

*\*Source IUCN/SSC African & Asian Rhino Specialist Groups & T. J. Foose International Rhino Foundation - August 2000*

The primary threats to Indian rhinos in India are poaching for the horn and habitat degradation due to loss of alluvial plain grasslands to agricultural development.

However, the pressure from poachers has been substantial, with some areas in India in particular impacted, e.g. Laokhowa (where the rhino has become extinct) and Manas (where the population has been reduced to no more than 20% of its previous levels in the 1980s). The number of rhinos lost to poachers from 1986 to 1995 has been reported as about 450 in India and about 50 in Nepal ( Menon 1996). The numbers of rhinos poached in both India and Nepal have declined in 1994 and 1995 compared to 1990–1993 (Foose & Strien, 1997). This decline in poaching is attributed to intense protection by the Indian and Nepalese wildlife authorities.

In both these countries, the programmes of protection and translocation must be continued and further increased. This is particularly so in India where there remain many areas (Laokhawa, Manas, Orang) which in recent history have had rhinos populations and are capable of accommodating populations of viable size, if properly protected. These areas should be

protected and new populations established. Alternatively, remnant ones could be reinforced, either through translocations from areas where populations now exist in sufficient numbers to be unaffected by removals (Foose & Strien, 1997) or by captive breeding programmes. Thus, managed breeding remains a potential tool for the conservation of Indian rhinoceros.

Given below are the detailed population estimates of the Indian rhinoceros:

**Table.B. Greater One-horned Rhinoceros Areas & Population Estimates**

Population Estimates for Indian Rhinoceros ( <i>Rhinoceros unicornis</i> )							
Locality	Year	Numbers	Source	Locality	Year	Numbers	Source
<b>INDIA</b>				<b>NEPAL</b>			
Kaziranga	1999	1649	[1]	Royal Chitwan	1999	600	[1]
Orang	1999	46	[1]	Royal Bardia	1999	51	[1]
Manas	1999	5	[1]	Suklaphanta	1999	1	[1]
Jaldapara	1999	53	[1]	<b>NEPAL - TOTAL</b>		652	
Gorumara	1999	19	[1]	<b>PAKISTAN</b>			
Pobitora	1999	76	[1]	Lal Sohanra	1995	2	[1]
Dudwa	1999	16	[1]	<b>CAPTIVE COLLECTIONS</b>			
Katerniaghat	1999	4	[1]	In Range States	1998	40	[2]
<b>INDIA TOTAL</b>		<b>1868</b>		Outside Range States	1998	98	[2]
						<b>CAPTIVE COLLECTIONS</b>	<b>138</b>
						<b>WILD POPULATIONS -</b>	<b>2522</b>
						<b>TOTAL INDIAN RHINO</b>	<b>2658</b>

**Sources for Population Tables.**

1. Van Strien & Foose. 2000. Report of IUCN SSC Asian Rhino Specialist Group, Regional Meeting, Kaziranga, February 1999
2. International Studbook, Great Indian Rhinoceros, Basel, 1999.

**Biological Data:****Scientific Name and Origin**

- *Rhinoceros unicornis*
- *Rhinoceros*: from the Greek *rhino*, meaning "nose" and *ceros*, meaning "horn"
- *unicornis*: from the Latin *uni*, meaning "one" and *cornis*, meaning "horn"

**Common Names**

- Asian greater one-horned rhinoceros: referring to the single large horn
- Indian and/or Nepalese rhinoceros: referring to the species' endemic range

**Habitat**

- Originally found on alluvial plain grasslands, where the grass grew up to eight metres tall. Also found in the adjacent swamps and forests. The Great Indian Rhino's range has now been so restricted by human activity that it often must use cultivated areas, pastures and modified woodlands.

**Current Distribution and Numbers - Northern India, southern Nepal**

- Approximately 2,400

**Size**

- 4,000-6,000 lb (1,800 - 2,700 kg) - perhaps more
- 5.75 - 6.5 ft (1.75 - 2.0 m) tall at shoulder
- Single horn 8 to 24 inch (20 to 61 cm) long
- Largest land mammal (after elephants) along with the African white rhino

**Physical Description**

- Brownish-gray, hairless, with rivet-plated (armor-plated), knobby skin
- One horn
- Upper lip semi-prehensile

**Life History Characteristics**

- Feeds on grasses, fruit, leaves, tree and shrub branches, cultivated crops
- Females sexually mature at 5 to 7 years of age (in captivity 4 years); males at 9 to 10 years (in captivity 7 to 8 years)
- Gestation period approximately 15 - 16 months; inter-birth interval of 1 calf every 3 years
- Life span approximately 47 years (captive record)

**Behaviour**

- Apart from cow-calf pairs, groups are rare. Temporary associations of a few sub-adults or adult males sometimes form at wallows or on grazing grounds.

**Source:** Van Strien & Foose. 2000. Report of IUCN SSC Asian Rhino Specialist Group, Regional Meeting, Kaziranga, February 1999

## Scope and Conventions of Studbook

### (A) ASSUMPTIONS

1. Animals bought from animal dealers are considered as wild born.
2. The year of capture is recorded as the year of the individual's transfer to its first captive facility.
3. If only the year of birth is known then 30<sup>th</sup> of June of that year is taken as the date of birth for an individual.
4. The exact wild capture locations for most of the individuals are not known and hence a broader location category i.e India is used.
5. If the final fate (when it is known what happened to the animal finally) of an individual is not known it is recorded as Lost-to-follow-up. Such individuals are shown as l t f between Local ID and event columns.
6. All individuals are identified by local/expert knowledge not by artificial markings and the animal keepers identify the unmarked individuals correctly.
7. The date of transfer is taken as the date on which animal is sent from an institution and if this date is not available then the date on which it is acquired by the subsequent institution is considered.
8. Individuals were assigned studbook numbers in an ascending order based on their date of birth. Older animals are listed first followed by younger animals, except in a few cases, when we received and recorded data after the allotment of permanent studbook numbers. These cases were, however allotted numbers in sequence to the last number recorded. In the present studbook these numbers start from 104 onwards.
9. The old National studbook numbers (allotted by Kanpur zoo in 1999) and the International studbook numbers are also given in Section 1 and 2 in a separate column.
10. Individuals, which were already assigned National stud numbers in the National studbook for the greater one-horned rhinoceros (current till 30<sup>th</sup> September 2000, compiled by Wildlife Institute of India, published in May 2001) have retained their old stud numbers in this studbook.
11. New individuals not recorded in the previous edition are allotted new stud numbers. The new national stud numbers start from 107.

### (B) SYMBOL USED:

1. **IN#:** Individuals present in International Studbook but missing in the records of respective zoos.

**(C) TIME SCALE:**

The earliest date entered in the studbook is September 1966 and data is current through September 2000. The studbook software used is SPARKS 1.52, its associated programmes and Population management 2000 version 1.202.

**ZOO SPECIFIC ISSUES:**

1. 11 Female Rangis received from Assam State Zoo, Guwahati, according to National Zoological Park, Delhi, records but no mention of this female was found in Guwahati zoo transfer records.
2. In Nehru Zoological Park, Hyderabad, records female Padma (13) was transferred to Hyderabad zoo from Assam State Zoo, Guwahati but no mention of this female's transfer is found in Guwahati zoo transfer records.
3. Two males studbook number 76 and 83 released in wildlife sanctuaries Gorumara and Jaldhapa respectively though listed amongst the current living population (section 2) are not included in the analysis.

**(E) SOURCES OF DATA:**

Through questionnaires, zoo records, already published National and International studbooks.

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National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National Stud #	International Stud #
84	M	~ 1989	WILD	WILD	INDIA ASSAM	~ 1989 26-Jul-89 4-Sep-89	NONE	Capture Transfer Death	DHAN		
85	M	20-Jun-89	37	34	KANPUR	20-Jun-89		Birth	ROHIT	NR036	160
86	M	~ 1989	WILD	WILD	INDIA ASSAM	~ 1989 25-Jun-89 26-Jun-89	NONE	Capture Transfer Death	KANAK		
87	M	~ Mar 1990	WILD	WILD	INDIA	~ 1990 22-Apr-90	NONE	Capture Death	PRAKASH		
88	M	~ 1990	WILD	WILD	INDIA ASSAM TRIPURA	~ 1990 20-Aug-90 14-Oct-94	NONE	Capture Transfer Transfer	PRADEEP	NR038	179
89	F	~ 1990	WILD	WILD	INDIA ASSAM	~ 1991 10-Aug-91	NONE	Capture Transfer	BAGHEKHATI	NR039	192
90	F	30-Apr-91	WILD	WILD	INDIA ASSAM	~ 1991 6-Aug-91 17-Aug-91	NONE	Capture Transfer Death	MONOMALI		
91	M	5-Jul-91	37	34	KANPUR	5-Jul-91 31-Dec-02		Birth Death	MUDIT	NR040	186
92	F	8-Jul-91	62	36	PATNA	8-Jul-91		Birth	CHOTKI	NR041	203
93	M	27-Dec-92	26	65	DELHI	27-Dec-92		Birth	AYODHYA		202

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National Stud #	International Stud #
94	F	25-Nov-94	58	60	ASSAM	25-Nov-94 25-Nov-94		Birth Death			
95	M	~ 1995	WILD	WILD	INDIA ASSAM	~ 1995 21-Mar-95 27-Nov-95	NONE	Capture Transfer Death	HANIUMAN		
96	F	22-Jan-95	44	50	ASSAM TRIVANDRU	22-Jan-95 ~ Nov 2003	UNK	Birth Transfer	RITA	NR042	235
97	M	~ 1995	WILD	WILD	INDIA ASSAM INDIA	~ 1995 11-Jun-95 5-Nov-95	NONE	Capture Transfer Death	RANGA		
98	M	28-Aug-95	26	65	DELHI	28-Aug-95 6-Mar-99		Birth Death	MEGHDOOT	NR045	251
99	M	29-Apr-96	78	34	KANPUR LUCKNOW	29-Apr-96 30-Apr-97 19-May-97		Birth Transfer Death	TARUN	NR043	
100	F	27-Nov-97	26	65	DELHI	27-Nov-97		Birth	MAHESWARI	NR046	252
101	F	15-Jun-99	58	60	ASSAM	15-Jun-99 15-Jun-99		Birth Death			
102	M	????	UNK	UNK	UNKNOWN ASSAM	??? ???		Birth Transfer	MADAN		
103	M	????	WILD	WILD	LOSANGELE INDIA	4-Dec-65 ~ 1988	lft NONE	Transfer Capture	BAUL		

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National Stud #	International Stud #
66	F	~ Apr 1982	WILD	WILD	INDIA ASSAM	~ 1982 2-May-82 27-Oct-82	NONE	Capture Transfer Death	DALIMI		
67	M	9-Jun-82	7	8	ASSAM	9-Jun-82 23-Sep-98		Birth Death	SHYAM JUNI		
68	F	1-Oct-82	37	34	KANPUR YOKOHAMA	1-Oct-82 31-Mar-85 4-Jan-95		Birth Transfer Death	RASHMI		122
69	M	15-Feb-83	43	27	CHATBIR Z	15-Feb-83 2-Mar-83		Birth Death			
70	F	~ Mar 1983	WILD	WILD	INDIA ASSAM	~ 1983 9-Apr-83 30-Apr-83	NONE	Capture Transfer Death	SABITRI		
71	M	4-Jun-84	23	32	CALCUTTA	4-Jun-84 13-Nov-00	5	Birth Death	DEBRAJ	NR024	150
72	M	6-Aug-84	37	34	KANPUR DUDHWA LUCKNOW	6-Aug-84 27-Apr-92 25-Nov-92 6-Apr-95		Birth Transfer Transfer Transfer	LOHIT	NR025	129
73	M	11-Dec-84	43	27	CHATBIR Z	11-Dec-84 21-Dec-84		Birth Death			

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National International Stud #
74	F	~ Dec 1985	WILD	WILD	INDIA ASSAM	~ 1986 27-Feb-86 28-Feb-86	NONE	Capture Transfer Death	SUCHILA	
75	M	9-May-86	43	27	CHATBIR Z	9-May-86		Birth	RAJA/PRINCE NR027	
76	M	~ Jan 1987	WILD	WILD	INDIA ASSAM GORUMARA	~ 1987 25-Aug-87 17-Oct-95	NONE	Capture Transfer Transfer	RATUL NR028	174
77	M	11-May-87	44	50	ASSAM	11-May-87		Birth	BISHNU NR030	173
78	M	17-Jun-87	37	34	KANPUR HYDERABAD	17-Jun-87 1-Mar-03		Birth Transfer	MOHIT NR029	140
79	M	~ Mar 1988	WILD	WILD	INDIA ASSAM TRIVANDRU	~ 1988 2-Sep-88 19-May-93	NONE	Capture Transfer Transfer	RAMU NR035	177
80	F	8-Jul-88	62	36	PATNA	8-Jul-88		Birth	HARTALI NR032	159
81	M	26-Jul-88	WILD	WILD	INDIA ASSAM TRIVANDRU	~ 1989 26-Jul-89 19-May-93	NONE	Capture Transfer Transfer	JADU NR035	177
82	M	30-Mar-89	44	50	ASSAM	30-Mar-89		Birth	MOHESH	176
83	M	~ Jun 1989	WILD	WILD	INDIA ASSAM JALDHAPAR	25-Jul-89 26-Jul-89 17-Oct-95	NONE	Capture Transfer Transfer	MADU	178

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National International Stud #	Stud #
50	F	9-Jan-78	7	8	ASSAM	19-Aug-77		Transfer			
					PATNA	25-May-79		Transfer			
					ASSAM	9-Jan-78		Birth	GEETA/LAXMI	NR017	168
						11-Jan-98		Death			
51	M	~ 1978	WILD	WILD	INDIA	~ 1978	NONE	Capture	KRISHNA Jr		92
					ASSAM	24-Mar-78		Transfer			
					KANPUR	17-Oct-79		Transfer			
					LUCKNOW	23-May-82		Transfer			
						1-Jan-85		Death			
52	M	~ Aug 1978	WILD	WILD	INDIA	~ 1978	NONE	Capture	PRABHAT		
					ASSAM	9-Nov-78		Transfer			
						24-Nov-78		Death			
53	M	12-Nov-78	12	13	HYDERABAD	12-Nov-78		Birth	LADDUVEER		96
					KENYA	17-Jun-83		Transfer			
54	F	9-Jan-79	23	10	CALCUTTA	9-Jan-79		Birth	GOMOTI		
					GERMANY	10-Mar-86		Transfer			
55	M	~ Mar 1978	WILD	WILD	INDIA	~ 1979	NONE	Capture	SHIVA		
					ASSAM	24-Apr-79		Transfer			
					VEERMATA	25-Feb-85		Transfer			
56	F	9-Mar-79	43	27	CHATBIR Z	9-Mar-79		Birth			
						9-Mar-79		Death			
57	F	~ Jul 1979	WILD	WILD	INDIA	~ 1980	NONE	Capture	PARBATI		
					ASSAM	20-Jan-80		Transfer			
						18-Jun-83		Death			

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National Stud #	International Stud #
58	M	~ Apr 1980	WILD	WILD	INDIA ASSAM	~ 1980 23-Aug-80	NONE	Capture Transfer	JOHNIPALIT	NR019	170
59	M	~ May 1980	WILD	WILD	INDIA ASSAM MADRAS	~ 1980 3-Sep-80 17-Apr-85 7-Jul-89	NONE	Capture Transfer Transfer Death	RAMU Sr		
60	F	~ 1980	WILD	WILD	INDIA ASSAM	~ 1980 23-Aug-80 ???	NONE	Capture Transfer Death	GINITARAL	NR020	171
61	F	13-Nov-80	43	27	CHATBIR Z DELHI	13-Nov-80 5-May-82 2-Jun-86		Birth Transfer Death			
62	M	~ 1979	WILD	WILD	INDIA PATNA	~ 1982 28-Mar-82 2-Apr-95	NONE	Capture Transfer Death	RAJU	NR022	157
63	M	15-May-81	12	13	HYDERABAD	15-May-81 6-Aug-01	5	Birth Death	SRINIVAS	NR021	106
64	F	~ Jun 1981	WILD	WILD	INDIA ASSAM	~ 1981 3-Jul-81 11-Oct-81	NONE	Capture Transfer Death	RUPA		
65	F	~ 1982	WILD	WILD	INDIA ASSAM DELHI	~ 1982 4-Jun-82 12-Dec-90	NONE	Capture Transfer Transfer	MOHINI/RUBY	NR037	194

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National Stud #	International Stud #
36	F	~ 1974	WILD	WILD	INDIA	~ 1974	NONE	Capture	CHITRALEKH A	NR011	155
					ASSAM	21-Jun-73		Transfer			
					NY BRONX	30-Jan-75		Transfer			
						12-Jul-76		Death			
					ASSAM	21-Jul-74		Transfer			
					PATNA	25-May-79		Transfer			
					RANCHI	4-Dec-96		Transfer			
37	M	23-May-74	7	8	ASSAM	23-May-74		Birth	LACHIT	NR010	70
					KANPUR	1-Mar-77		Transfer			
						8-Aug-92		Death			
38	F	~ Jun 1974	WILD	WILD	INDIA	~ 1974	NONE	Capture	NUMALI	NR009	153
					ASSAM	16-Sep-74		Transfer			
					NANDANKAN	4-Apr-76		Transfer			
39	F	~ 1975	WILD	WILD	INDIA	9-Aug-75	NONE	Capture	ANJALI		
					ASSAM	10-Aug-75		Transfer			
						20-Aug-77		Death			
40	M	~ 1975	WILD	WILD	INDIA	~ 1980	NONE	Capture	RAM/MUNNI	NR026	61
					ASSAM	24-Jan-80		Transfer			
					MYSORE	23-Jan-85		Transfer			
						2-Aug-02		Death			
41	M	~ 1975	WILD	WILD	INDIA	~ 1976	NONE	Capture			
					ASSAM	2-Feb-76		Transfer			
						7-Mar-76		Death			
42	M	~ May 1975	WILD	WILD	INDIA	~ 1975	NONE	Capture	SHAYAM		
					ASSAM	2-Jun-75		Transfer			

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National International Stud #
43	M	~ 1970	WILD	WILD	NANDANKAN ON THE WAY	4-Apr-76 22-Apr-76		Transfer Death		
					INDIA ASSAM	~ 1977 17-Oct-77	NONE	Capture Transfer	BALRAMIGAN NR014	
					CHATBIR Z ASSAM	14-Dec-77 3-Jul-93		Transfer Death		
44	M	~ 1976	WILD	WILD	INDIA ASSAM	~ 1980 27-Jan-80	NONE	Capture Transfer	LAKSMAN NR012	168
45	F	~ Mar 1976	WILD	WILD	INDIA ASSAM	~ 1976 6-Apr-76	NONE	Capture Transfer		
					LUCKNOW	17-Oct-79 19-Dec-83		Transfer Death		
46	M	1-Nov-76	WILD	WILD	INDIA ASSAM	~ 1976 13-Nov-76	NONE	Capture Transfer	SANJAI	91
					LUCKNOW	17-Oct-79 18-Jan-80		Transfer Death		
47 NR013	M	~ 1977	WILD	WILD	INDIA	~ 1977	NONE	Capture	NANDAN NR013	
					ASSAM NANDANKAN	22-Aug-77 29-Nov-79		Transfer Transfer		
48	M	~ 1977	WILD	WILD	INDIA ASSAM	~ 1982 6-Feb-82 7-Feb-82	NONE	Capture Transfer Death	KAMAL	
49	M	~ Apr 1977	WILD	WILD	INDIA	~ 1977	NONE	Capture	KANCHA NR016	156



National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National Stud #	International Stud #
28	F	28-Jan-71	9	11	ASSAM CHATBIR Z	15-Jun-78 29-Jul-78 25-May-86	_____	Transfer Transfer Death	ROOPA	51	
29	M	12-Sep-71	7	8	ASSAM NAGOYA	12-Sep-71 29-Sep-74	_____	Birth Transfer	KRISHINA	57	
30	M	25-Nov-71	12	13	HYDERABAD	25-Nov-71 11-Aug-83	_____	Birth Death	RAJESH	58	
31	M	~ 1972	WILD	WILD	INDIA ASSAM	~ 1982 15-Jul-82	NONE	Capture Transfer	GANESH Jr	NR006	172
32	F	~ 1973	WILD	WILD	INDIA ASSAM CALCUTTA	~ 1974 22-Jan-74 11-Mar-74	NONE	Capture Transfer Transfer	MAYURI/KAD	NR007	95
33	F	~ Apr 1973	WILD	WILD	INDIA ASSAM NY BRONX	~ 1973 14-Aug-73 25-Sep-74	NONE	Capture Transfer Transfer	MAYANGKUMARI		66
34	F	~ May 1973	WILD	WILD	INDIA ASSAM KANPUR LUCKNOW HYDERABAD	~ 1973 11-Aug-73 1-Mar-77 30-Apr-97 23-Sep-99	NONE	Capture Transfer Transfer Transfer Transfer	MAYA	NR008	128
35	F	16-Jun-73	WILD	WILD	INDIA	~ 1973	NONE	Capture	RADHA		67

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Stud #	Stud #
7	M	~ 1954	WILD	WILD	INDIA	~ 1960	NONE	Capture	SHIVAJI	24	24
					ASSAM	24-Sep-60 23-Sep-84	—	Transfer Death			
8	F	~ 1956	WILD	WILD	INDIA	~ 1965	NONE	Capture	PADMINI Jr	25	25
					ASSAM	29-Sep-65 19-Oct-82	—	Transfer Death			
9	M	7-Apr-60	WILD	5	ASSAM DELHI	7-Apr-60 1-Dec-65 5-Jul-88	— — —	Birth Transfer Death	MOHAN Jr	33	33
10	F	12-Jun-61	WILD	105	CALCUTTA	12-Jun-61 14-Aug-82	— —	Birth Death	SNEHA	23	23
11	F	~ 1962	WILD	WILD	INDIA ASSAM DELHI	??? ??? 28-Mar-68 10-Nov-84	NONE — — —	Capture Transfer Transfer Death	RANGI	43	43
12	M	~ 1962	WILD	WILD	INDIA ASSAM HYDERABAD	~ 1962 28-Jun-62 16-Jun-64 19-Aug-83	NONE — — —	Capture Transfer Transfer Death	RAJKUMAR	NR003	76
13	F	~ 1963	WILD	WILD	INDIA ASSAM HYDERABAD	??? ??? 26-Jun-68	NONE — — —	Capture Transfer Transfer	PADMA	NR004	77

National		Sex		Birth Date		Sire		Dam		Location		Date		Local ID		Event		Name		Old National International	
Stud #																			Stud #	Stud #	
14	F	10-Apr-63	WILD	6	ASSAM U.S.A.	10-Apr-63 5-Nov-63 9-Sep-80												RAJKUMARI		28	
15	F	10-Jul-63	7	3	ASSAM SANDIEGOZ SD-WAP GULF BREZ	10-Jul-63 11-Feb-65 26-Apr-72 7-Nov-95												JAPARI		29	
16	M	~ Jun 1964	WILD	WILD	INDIA ASSAM	~ 1964 28-Oct-64 13-Nov-64												KOSHA			
17	F	~ Apr 1967	WILD	WILD	INDIA ASSAM LOSANGELE	~ 1967 23-Dec-67 25-Nov-69 10-Nov-88												RUKIMINI		46	
18	F	~ 1968	WILD	WILD	INDIA ASSAM	~ 1968 28-Feb-68 23-Mar-70												LAKHIMI			
19	F	~ 1968	WILD	WILD	INDIA ASSAM BARODA MYSORE	~ 1968 1-Aug-68 5-Apr-69 19-Jan-90												KALONGMUK H			
20	M	~ Jul 1968	WILD	WILD	INDIA ASSAM	~ 1969 23-Jul-69 23-Mar-70												KUMAR			

**Table 5** : Breeding pair recommended for captive one horned rhinoceros

Serial #	Studbook # of mating pairs	Transfer involved	Inbreeding co-efficient of offspring
1	Male 31 x female 89	No transfer (both in Assam)	0
2	Male 79 x female 96	No transfer (Both in Trivandarum)	0
3	Male 47 x female 92	Male from Nandankanan to Patna	0
4	Male 55 x female 80	Male from Veermata to Patna	0
5	Male 88 x female 100	Male from Tripura to Delhi	0
6	Male 58 x female 108	Male from Assam to Kanpur	0

Transfer recommendations ideally should be made taking logistic difficulties (especially distance and cost of transport) into consideration but that possibility have been overlooked in case of pair # 4,5 and 6 as males in Nanadankanan, Veermata, and Tripura zoos are the wild caught potential males with the mating partners. So transferring them to the zoos which have potential females and have successfully bred rhinoceros in past was considered appropriate.

If mating is successful as per recommendations then there will be an improvement in genetic status of one horned rhinoceros population as shown in **Table 6**.

**Table 6.** Change in genetic status after mating recommendations for captive one horned rhinoceros population

	Initial status	After mating recommendations
Population size N	23	29
Founder genome equivalents	6.20	7.96
Gene diversity retained	.92	.94
Mean kinship	.080	.062
% of pedigree known	100	100

Section 1

HISTORICAL LISTING OF GREATER ONE HORNED RHINOCEROS (*Rhinoceros unicornis*)

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National Stud #	International Stud #
1	M	~ 1914	WILD	WILD	INDIA ASSAM DELHI	~ 1957 13-Dec-57 5-Apr-59 13-Apr-70	NONE	Capture Transfer Transfer Death	MOHAN Sr		
2	M	~ 1940	WILD	WILD	INDIA ASSAM	~ 1978 3-Mar-78 18-Jan-87	NONE	Capture Transfer Death	RAJESH		
3	F	~ 1948	WILD	WILD	INDIA ASSAM	~ 1958 5-Oct-58 28-Oct-64	NONE	Capture Transfer Death	PADMINI Sr		82
4	M	~ 1950	WILD	WILD	INDIA ASSAM TRIVANDRU	???? ???? 29-May-56 16-Feb-87	NONE	Capture Transfer Transfer Death	MONY		
5	F	~ 1951	WILD	WILD	INDIA ASSAM PARIS	~ 1960 19-Mar-60 ????	NONE UNK	Capture Transfer Transfer	GEETA		
6	F	~ 1952	WILD	WILD	INDIA ASSAM WASHINGTON	~ 1962 29-Oct-62 5-Nov-63 28-Dec-63	NONE	Capture Transfer Transfer Death	DEEPAI Sr		30

Table 4. Ordered lists of mean kinship by sex

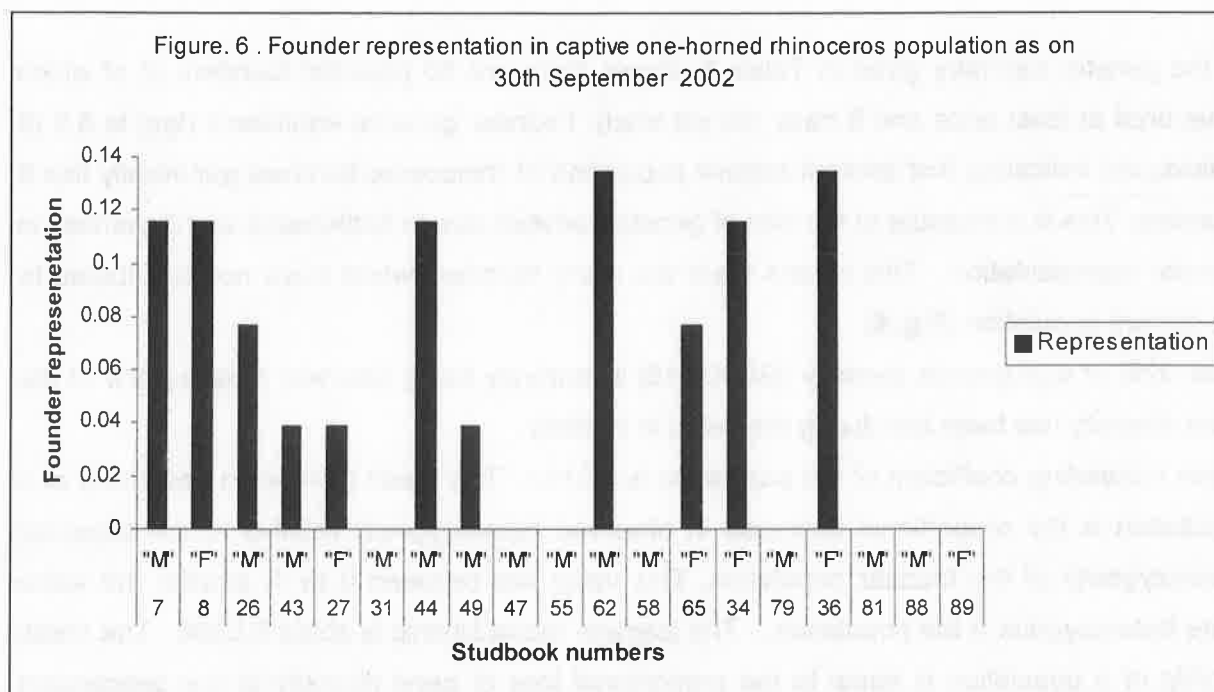
Male					Female				
National Stud#	MK	% Known	Age	Location	National Stud#	MK	% Known	Age	Location
31	0	100	31	ASSAM	89	0	100	13	ASSAM
47	0	100	26	NANDANKAN	100	0.058	100	6	DELHI
55	0	100	26	VEERMATA	92	0.087	100	12	PATNA
58	0	100	24	ASSAM	96	0.091	100	9	ASSAM
79	0	100	16	TRIVANDRU	80	0.096	100	15	PATNA
81	0	100	15	TRIVANDRU	108	0.101	100	9	KANPUR
88	0	100	13	TRIPURA					
49	0.019	100	27	PATNA					
75	0.038	100	18	CHATBIR Z					
44	0.058	100	27	ASSAM					
93	0.058	100	11	DELHI					
107	0.063	100	10	PATNA					
72	0.091	100	19	LUCKNOW					
77	0.091	100	17	ASSAM					
78	0.091	100	16	HYDERABAD					
82	0.091	100	15	ASSAM					
85	0.091	100	14	KANPUR					

Key: Known-% of each animal's pedigree that is known. MK- Mean Kinship

### **Management and Breeding recommendations:**

To achieve demographic and genetic goals under current scenario there is need to increase population growth rate, rectify past disparities in founder representations, regulate family sizes and sex ratios to maximise effective size of population. It could be accomplished by optimising breeding conditions by reducing mortality and increasing fertility. Hence the most important recommendation for the zoo managers would be-

1. **Acquire more females from foreign zoos:** As mentioned earlier sex ratio is highly biased towards males. There are only 4 breeding females in the captivity against 17 breeding males. Hence, there is need to import some more females to optimise the sex ratio in captivity in India. The good news is there are three new born female in captivity. So it is important to provide them proper care so that they survive to breed.
2. **Research and husbandry improvements:** To know the causes of high mortality (in juvenile and adults) and low fertility in their zoos. There is need to devise appropriate research and husbandry programmes to resolve the problems. It is vital to do post-mortems for all individuals dying and record causes of death whether they are due to congenital factors, due to insufficient maternal care or disease related. Similarly, research should be taken on issues of infertility whether it is due to non-conducive environment, inbreeding, stress, non-compatible mates so on. For example in Nandankanan zoo, there is pair together since 1979 but they never bred.
3. **Animal Identification:** There is foremost need to give Individual identification to each captive individual. Without reliable techniques for individual recognition the data from even the most carefully maintained studbook are open to dispute. Though animal keepers in Indian zoos are a very important source of information on the individuals, one cannot rely on experience or memory alone to track individual specimens;
  - Firstly, animal keepers should be trained to use standard and adequate methods of animal identification. In absence of transponder, ear tag, tattoo etc they can be trained to identify individual by their unique physical markings. Whatever technique an institution uses should be recorded and explained properly.
  - Secondly, zoo directors should not change sections of animal keepers unless it is absolutely essential. This will maintain consistency in animal identification, record keeping and will make animal keepers answerable for their sections.
4. **Mating recommendations:** Table 5 gives mating pairs recommended for the next year.



Definitions of the terms mentioned in **Table 2** are given below:

- **Representation:** It gives percentage of the current population descended from a particular founder. For example if it is 0 (eg. Studbook # 31) then 0% of current population are descended from stud # 31. Value of 0.1154 (as given in Table 2 for an individual having studbook # 34) shows that 11% of current population are descended from this particular individual.
- **Contribution:** It calculates equivalent number of living animals solely descended from each founder. For example, an immediate offspring of a founder will acquire half of the alleles from the founder, therefore one offspring represents the equivalent of only 0.5 (50%) of an animal solely descended from that founder. If this immediate offspring of founder breeds, will contribute 0.25 (25%) of the alleles of founder in a direct second generation descendant. Therefore, a founder with one immediate offspring and one direct second generation descendant in the living population has a founder contribution of  $0.5+0.25=0.75$ .
- **Allele retention:** The proportion of the total genome from each founder that is represented in the living descendant population. If a founder has had two offspring, it is likely to have passed 75% of its genetic material (retention-0.75). If a founder had only one offspring, who in turn had one offspring before dying, only 25% (retention=0.25) of that founder's genetic material will remain in the descendant population. Where the retention is 0, the animal has yet to breed. If the founder is alive, then its retention can improve. The values given for **potential retention** shows possibility for an animal to pass 100% of its genetic material. But in practice, these are not attainable. Thus, these are theoretical numbers.

In the genetic summary given in **Table 3**, shows there are 10 potential founders (2 of which have bred at least once and 8 have not yet bred). Founder genome equivalent (fge) is 6.2 (6 individuals) indicating that present captive population of rhinoceros behaves genetically like 6 founders. This is a measure of the loss of genetic variation due to bottlenecks and disparities in founder representation. This means there are many founders which have not contributed to the current population (**Fig. 6**)

Over 92% of wild genetic diversity (GD=0.916) is currently being retained; meaning 8% of the gene diversity has been lost during the years in captivity.

Mean Inbreeding coefficient of the population is 0.0192. The mean inbreeding coefficient of a population is the proportional decrease in observed heterozygosity relative to the expected heterozygosity of the founder population. This value lies between 0 to 1; smaller the value more heterozygous is the population. The average mean kinship is about 0.0806. The mean kinship of a population is equal to the proportional loss of gene diversity of the descendant (captive-born) population relative to the founders. Low mean kinship value signifies rare genes and less relatives in the population.

The population has 8 living founders not represented in the descendent population yet. Hence there is potential to improve the genetic diversity of current population by breeding these founders.

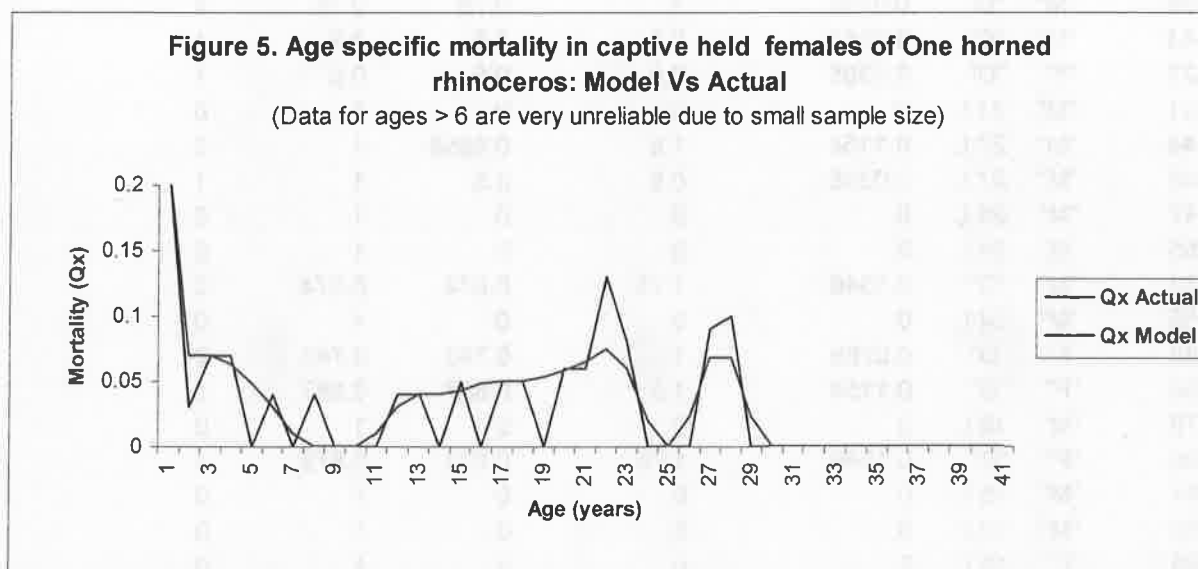
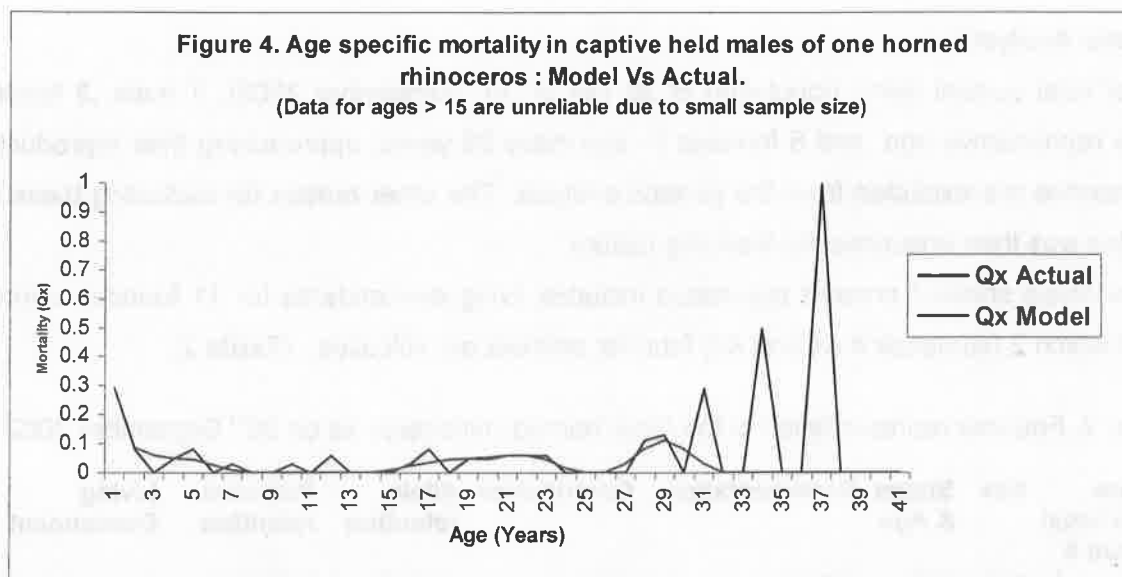
**Table 3.** Genetic Summary of captive one horned rhinoceros as on 30<sup>th</sup> September 2002

	Current	Potential
Founders	11	8 + 2
Founder genome equivalents (fge)	6.20	16.50
Founder genome surviving	7.87	16.50
Gene diversity retained (GD)	0.92	0.97
Population mean kinship	0.086	
Mean inbreeding	0.019	
% of pedigree known	100 %	

Note: Definitions of all terms used are given in Glossary

**Table 4** ,shows ordered list of Mean kinship (MK), the analysis has been carried out using PM 2000

Mean kinship measures the genetic importance of each rhinoceros relative to all others in the analyses. The younger animals are given less weightage as they have more years of breeding life left, and hence there is no urgency to breed these individuals as compared with older animals nearing reproductive senescence.



Analysis done on captive born individuals showed that maximum age a captive born male lived is 28 years 3 months and female is 21 years 2 months.

#### **Instantaneous rate of growth (r)**

The rate of growth for males is  $r = -0.0621$  and for females is  $r = -0.0526$ . This means population is decreasing for males by 6% per year and for females by 5% per year.

#### **Projected growth rate ( $\lambda$ )**

$\lambda$  for one horned rhinoceros population as on 30<sup>th</sup> December 2002 is 0.94 means a 6% decline in population size per year.  $\lambda$  and  $r$  are calculated on the bases of birth and death rates in the life table.

### Genetic Analysis

Out of total current living population of 32 (as of 30<sup>th</sup> September 2002), 1 male ,3 females below reproductive age, and 5 females (> age class 28 years) approaching their reproductive senescence are excluded from the genetic analysis. The other reason for excluding these old females was their unsuccessful breeding history.

The analysis showed present population includes living descendants for 11 founder animals, out of which 2 (studbook # 44 and 49) founder animals are still alive. (**Table 2**).

**Table. 2.** Founder representation in the One- horned rhinoceros as on 30<sup>th</sup> September 2002

New National Stud #	Sex	Status & Age	Representation	Contribution	Allele retention	Potential retention	Living Descendant
7	"M"	"D"	0.1154	1.5	0.6925	0.6925	6
8	"F"	"D"	0.1154	1.5	0.6985	0.6985	6
26	"M"	"D"	0.0769	1	0.75	0.75	2
43	"M"	"D"	0.0385	0.5	0.5	0.5	1
27	"F"	"D"	0.0385	0.5	0.5	0.5	1
31	"M"	31 L	0	0	0	1	0
44	"M"	27 L	0.1154	1.5	0.8855	1	3
49	"M"	27 L	0.0385	0.5	0.5	1	1
47	"M"	26 L	0	0	0	1	0
55	"M"	26 L	0	0	0	1	0
62	"M"	"D"	0.1346	1.75	0.874	0.874	3
58	"M"	24 L	0	0	0	1	0
65	"F"	"D"	0.0769	1	0.743	0.743	2
34	"F"	"D"	0.1154	1.5	0.887	0.887	3
79	"M"	16 L	0	0	0	1	0
36	"F"	"D"	0.1346	1.75	0.873	0.873	4
81	"M"	15 L	0	0	0	1	0
88	"M"	13 L	0	0	0	1	0
89	"F"	13 L	0	0	0	1	0

Key: M= male F= female L= Living individual D= dead individual

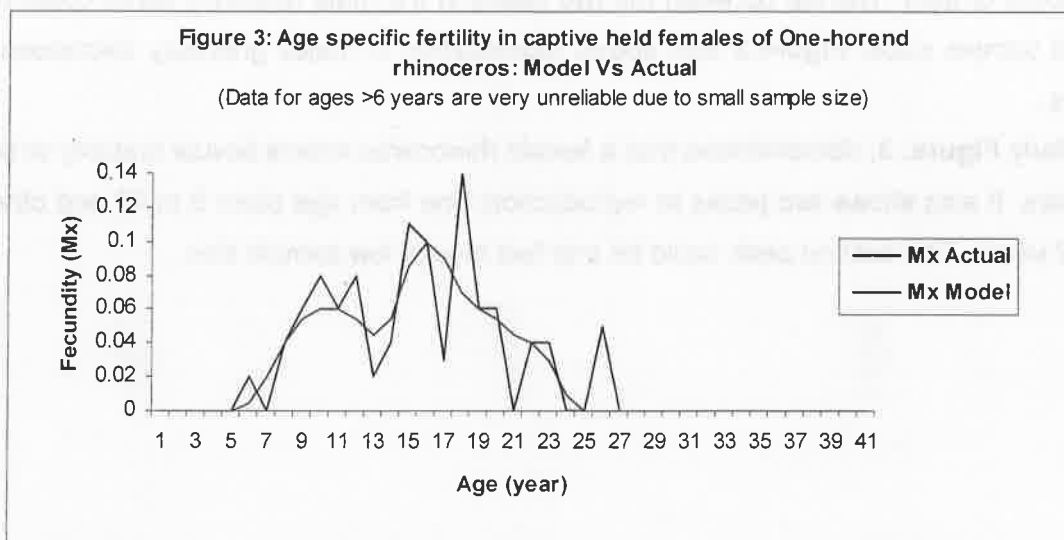
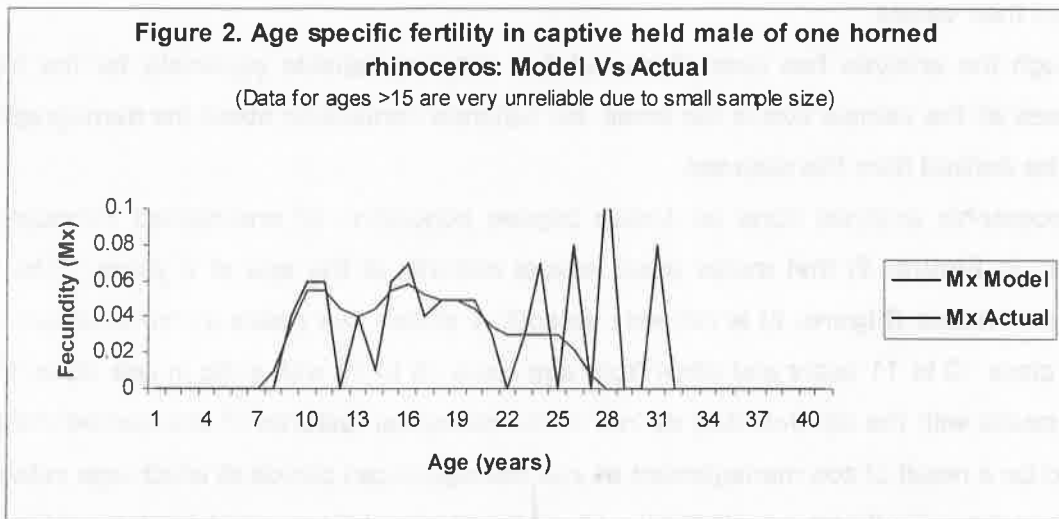
Founder representation shown in **Figure .6**, clearly indicates that the reproductive success and founder representation of the wild caught animals has been very variable with some animals being hardly represented in the current stock, while other founders are fully represented. 8 wild caught (Listed in **Table2** ) animals are the potential founders and have not bred yet and hence not contributed to the captive population.

fictitious value in age classes with zero values and the small sample sizes in older classes can distort their values.

Though the analysis has been done but it is not very reliable especially for the higher age classes as the sample size is too small. No concrete conclusion about the demographic trends can be derived from this data set.

Demographic analysis done on Indian captive population of one-horned rhinoceros shows (given in **Figure. 2**) that males attain sexual maturity at the age of 8 years. The fecundity curve of males (**Figure. 2**) is not very smooth, it shows two peaks in reproduction: one from age class 10 to 11 years and other from age class 15 to 16 with a dip in age class 13. These two peaks with the dip definitely do not reflect biological features of one-horned rhinoceros. It could be a result of zoo management as zoo managers can decide at which age individuals are to be paired. Furthermore, life tables in studbook populations are based on relatively small numbers of data. The dip between the two peaks in the male fecundity curve could be due to small sample sizes. **Figure.2** also shows reproduction in males gradually decreases after 16 years.

Similarly **Figure. 3**, demonstrates that a female rhinoceros attains sexual maturity at the age of 6 years. It also shows two peaks in reproduction: one from age class 9 to 12 and other at age of 12 years. This second peak could be arte fact of very low sample size.



When the analysis was done on captive born individuals (excluding wild born to avoid estimated age), it was found mean age of captive born females at first reproduction is about 10 years (N=4) and for males 8 ½ years (N=4). Mean age of captive born females at reproduction is about 11 years 7 months (N=4) and males 11 years 3 months (N=4).

The mean litter size is 1 (N=9).

#### **Mortality:**

The mortality rate  $Q_x$  of an age class is the proportion of animals belonging to that class and dying before reaching the next age class. The data for mortality have also been smoothed and the mortality values for the oldest age classes were corrected to reality.

Analysis showed that 30 days mortality for both sexes is 19.1% (9 of 47 neonates). The first year mortality is slightly higher for males (**Figure. 4**) i.e. 29% than females (**Figure. 5**), which is 21%.

### Status of the species in Indian zoos:

A total of 123 individuals are registered in the present studbook. Of these 77 individuals (63%) are wild caught and 45 (37%) are captive born. As of 30<sup>th</sup> September 2002, there are 32 individuals held in 13 institutions of India, out of these 56% (18) individuals are wild caught and 44% (14) captive born.

### Demographic analysis:

The details of the status of total captive population has been summarized in Table. 1.

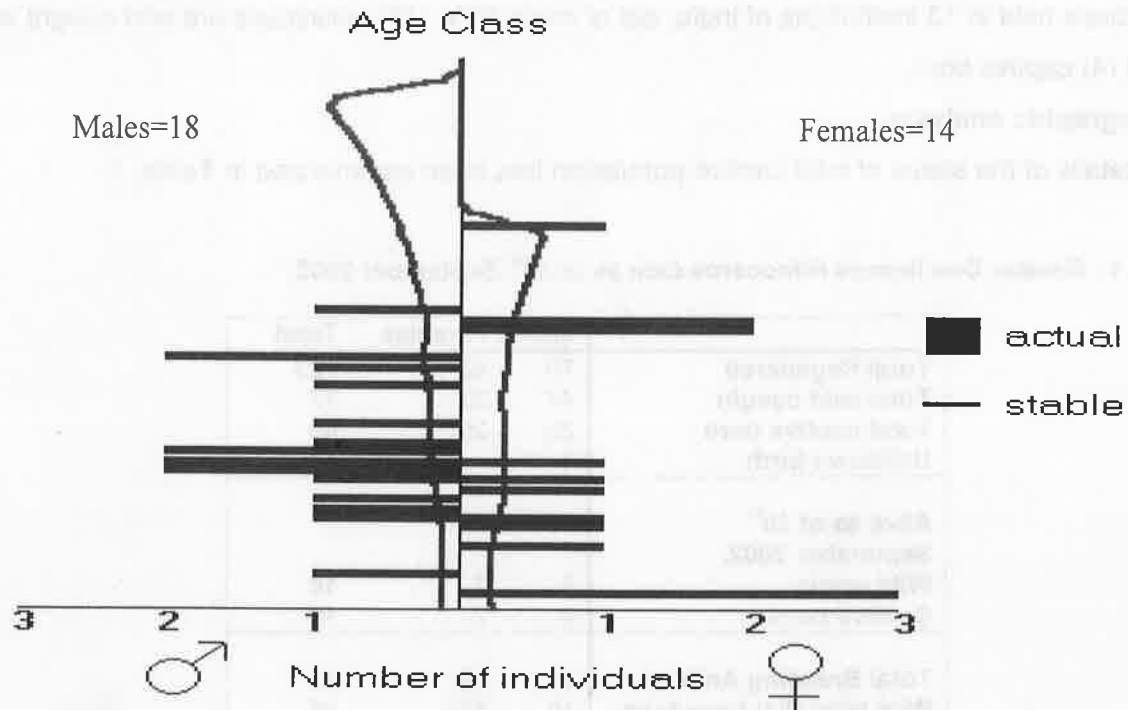
Table.1: Greater One horned rhinoceros data as of 30<sup>th</sup> September 2002.

	Male	Females	Total
<b>Total Registered</b>	70	53	123
<b>Total wild caught</b>	44	33	77
<b>Total captive born</b>	25	20	45
<b>Unknown birth</b>	1		1
<b>Alive as of 30<sup>th</sup> September 2002.</b>			
<b>Wild origin</b>	9	7	16
<b>Captive born</b>	9	7	16
<b>Total Breeding Animals</b>	14	19	33
<b>Wild born that have bred</b>	10	15	25
<b>Captive born that have bred</b>	4	4	8
<b>Living proven breeders (animals who have bred at least once)</b>			
<b>Wild born</b>	3	5	8
<b>Captive born</b>	2	2	7

Pyramid shapes, (i.e. younger age classes are larger than older age classes) indicate that a population is either stable or growing. The age pyramid as shown in **Figure 1** demonstrates declining population trend in captivity, there is complete absence of recent births especially in case of males. The sex ratio is biased towards males. There are 18 males and 14 females. Out of total 14 females 3 females lies below reproductive age (i.e. less than 5 years) and 5 have already reached reproductive senescence (i.e. above 28 years). Hence, this leaves only 43% (6 females) reproductively potential females. Where as, 17 males out of 18 falls in reproductive age class i.e. between 8 to 35 years. This type of age structure is potentially unstable because it shows many males in the reproductive age class are unable to reproduce due to lack of partners. Only four institutions out of 13 have mating pair.

Figure 1. Age distribution in the captive population of one-horned rhinoceros as on 30th

September 2002



Demographic analysis gives the life table of captive population, which indicates the different phases of animals at various age classes during its lifetime. The life tables of captive animals do not necessarily show biological features of a species. It evaluates zoo management in the past. The main indicators from the life table can be used to evaluate the health of captive population. These are fecundity ( $M_x$ ) and mortality ( $Q_x$ ). The instantaneous growth rate ( $r$ ) and projected growth rate ( $\lambda$ ) give an indication of the population's overall health. The life table does not take import of any individual from wild or release into wild into consideration for calculating the population parameters. It is entirely based on actual births and deaths happened in the captivity. These terms are defined in glossary (Appendix-I).

**Fecundity (Fertility):**

A successful parentage in one-horned rhinoceros ranges mainly from 4 to 32 years in females, and 7 to 40 years in males (Dec. 1998, International Studbook for One horned rhinoceros). The fecundity and mortality figures were exported SPARKS to PM 2000 for the demographic analysis. The data have been smoothed once after which the fertility values for the oldest and youngest age classes were corrected to reality as the smoothing process can put a small

**(Founder) Representation** – Proportion of the genes in the descendant population that derives from that founder. I.e., proportional Founder Contribution.

**Allele Retention** – The probability that a gene present in a founder individual exists in the living, descendant population.

## Appendix-II

## Full name of Institutions

Trivandru Bannergha	Thiruvananthapuram Zoo, Kerala, India Bannerghatta Zoological Garden, Bangalore, Karnataka
Chatbir Z Nandankan	M.C Zoological Park, Punjab, India Nandankanan Zoological Park, Bhubaneswar, Orissa, India
Washingto	Smithsonian National Zoological Park, Washinton, D.C, U.S.A
Toronto NY Bronx	Toronto Zoo, Ontario, Canada Wildlife Conservation Park Bronx Zoo, NY, U.S.A
Nagoya SandiegoZ	Nagoya Higashiyama Zoo, Japan San Diego Zoological Society Wild Animal Park, U.S.A
Gulf Brez Losangele Whipsnade Yokohama	The Gulf Breeze Zoo, Florida, U.S.A Los Angeles Zoo, U.S.A Whipsnade Wild Animal Park, U.K Kanazawa Zoological Gardens of Yokohama, Japan

## Appendix I

### Glossary

**Age Distribution** -- A two-way classification showing the numbers or percentages of individuals in various age and sex classes.

**Population Growth Rate** (Lambda,  $\lambda$ ) -- The proportional change in population size from one year to the next. Lambda can be based on life-table calculations (the expected lambda) or from observed changes in population size from year to year. A lambda of 1.11 means a 11% per year increase; lambda of .97 means a 3% decline in size per year.

**P<sub>x</sub>, Age-Specific Survival** -- The probability that an individual of age  $x$  survives one time period; is conditional on an individual being alive at the beginning of the time period. Alternatively, the proportion of individuals which survive from the beginning of one age class to the next.

**Q<sub>x</sub>, Mortality** -- Probability that an individual of age  $x$  dies during time period.  $Q_x = 1 - P_x$   
The proportion of individuals that die during an age class. It is calculated from the number of animals that die during an age class divided by the number of animals that were alive at the beginning of the age class (i.e. "at risk").

**I<sub>x</sub>, Age-Specific Survivorship** -- The probability that a new individual (e.g., age 0) is alive at the *beginning* of age  $x$ . Alternatively, the proportion of individuals which survive from birth to the beginning of a specific age class.

**M<sub>x</sub>, Fecundity** -- The average number of same-sexed young born to animals in that age class. Because SPARKS is typically using relatively small sample sizes, SPARKS calculates M<sub>x</sub> as 1/2 the average number of young born to animals in that age class. This provides a somewhat less "noisy" estimate of M<sub>x</sub>, though it does not allow for unusual sex ratios. The fecundity rates provide information on the age of first, last, and maximum reproduction.

**V<sub>x</sub>, Reproductive Value** -- The expected number of offspring produced this year and in future years by an animal of age  $x$ .

**E<sub>x</sub>, Life Expectancy** -- Average years of further life for an animal in age class  $x$ .

**Risk (Q<sub>x</sub> or M<sub>x</sub>)** -- The number of individuals that have lived during an age class. The number at risk is used to calculate M<sub>x</sub> and Q<sub>x</sub> by dividing the number of births and deaths that occurred during an age class by the number of animals at risk of dying and reproducing during that age class.

### Genetic Terms

**(Founder) Contribution** -- Number of copies of a founder's genome that are present in the living descendants. Each offspring contributes 0.5, each grand-offspring contributes 0.25, etc.

**Current Gene Diversity (GD)** -- The proportional gene diversity (as a proportion of the source population) is the probability that two alleles from the same locus sampled at random from the population will be identical by descent. Gene diversity is calculated from allele frequencies, and is the heterozygosity expected in progeny produced by random mating, and if the population were in Hardy-Weinberg equilibrium.

**Effective Population Size** (Inbreeding  $N_e$ ) -- The size of a randomly mating population of constant size with equal sex ratio and a Poisson distribution of family sizes that would (a) result in the same mean rate of inbreeding as that observed in the population, or (b) would result in the same rate of random change in gene frequencies (genetic drift) as observed in the population. These two definitions are identical only if the population is demographically stable (because the rate of inbreeding depends on the distribution of alleles in the parental generation, whereas the rate of gene frequency drift is measured in the current generation).  
 $N_e/N$

**Founder** -- An individual obtained from a source population (often the wild) that has no known relationship to any individuals in the derived population (except for its own descendants).

**Founder Genome Equivalents** (FGE) -- The number wild-caught individuals (founders) that would produce the same amount of gene diversity as does the population under study. The gene diversity of a population is  $1 - 1 / (2 * FGE)$ .

**Founder Genome Surviving** -- The sum of allelic retentions of the individual founders (i.e., the product of the mean allelic retention and the number of founders).

**GU, Genome Uniqueness** -- Probability that an allele sampled at random from an individual is not present, identical by descent, in any other living individual in the population. GU-all is the genome uniqueness relative to the entire population. GU-Desc is the genome uniqueness relative to the living non-founder, descendants.

**Inbreeding Coefficient** (F) -- Probability that the two alleles at a genetic locus are identical by descent from an ancestor common to both parents. The mean inbreeding coefficient of a population will be the proportional decrease in observed heterozygosity relative to the expected heterozygosity of the founder population.

**KV, Kinship Value** -- The weighted mean kinship of an animal, with the weights being the reproductive values of each of the kin. The mean kinship value of a population predicts the loss of gene diversity expected in the subsequent generation if all animals were to mate randomly and all were to produce the numbers of offspring expected for animals of their age.

**Mean Generation Time** (T) -- The average time elapsing from reproduction in one generation to the time the next generation reproduces. Also, the average age at which a female (or male) produces offspring. It is not the age of first reproduction. Males and females often have different generation times.

**Mean Kinship** (MK) -- The mean kinship coefficient between an animal and all animals (including itself) in the living, captive-born population. The mean kinship of a population is equal to the proportional loss of gene diversity of the descendant (captive-born) population relative to the founders and is also the mean inbreeding coefficient of progeny produced by random mating. Mean kinship is also the reciprocal of two times the founder genome equivalents:  $MK = 1 / (2 * FGE)$ .  $MK = 1 - GD$ .

**Percent Known** -- Percent of an animal's genome that is traceable to known Founders. Thus, if an animal has an UNK sire, the % Known = 50. If it has an UNK grandparent, % Known = 75.

**Prob Lost** -- Probability that a random allele from the individual will be lost from the population in the next generation, because neither this individual nor any of its relatives pass on the allele to an offspring. Assumes that each individual will produce a number of future offspring equal to its reproductive value,  $V_x$ .

Old National International  
Stud# Stud# Stud #

114 F 8-Aug-02 49 80 PATNA 8-Aug-02 \_\_\_\_\_ Birth AKANSHA

Total: 3.3.0 ( 6)

**Ranchi Zoo, Ranchi, Chatsgarh**

36 F ~ 1974 WILD WILD INDIA ~ 1974 NONE Capture CHITRALEKHA 155  
 ASSAM 21-Jul-74 \_\_\_\_\_ Transfer  
 PATNA 25-May-79 \_\_\_\_\_ Transfer  
 RANCHI 4-Dec-96 \_\_\_\_\_ Transfer

Total: 0.1.0 ( 1)

**Sephaljala Zoological Park, Tripura**

88 M ~ 1990 WILD WILD INDIA ~ 1990 NONE Capture PRADEEP 179  
 ASSAM 20-Aug-90 \_\_\_\_\_ Transfer  
 TRIPURA 14-Oct-94 \_\_\_\_\_ Transfer

Totals: 1.0.0 ( 1)

**Thiruvananthapuram Zoo, Kerala**

79 M ~ Mar 1988 WILD WILD INDIA ~ 1988 NONE Capture RAMU 177  
 ASSAM 2-Sep-88 \_\_\_\_\_ Transfer  
 TRIVANDRU 19-May-93 \_\_\_\_\_ Transfer

81 M 26-Jul-88 WILD WILD INDIA ~ 1989 NONE Capture JADU 177  
 ASSAM 26-Jul-89 \_\_\_\_\_ Transfer  
 TRIVANDRU 19-May-93 \_\_\_\_\_ Transfer

96 F 22-Jan-95 44 50 ASSAM 22-Jan-95 \_\_\_\_\_ Birth RITA 235  
 TRIVANDRU ~ Nov 2003 UNK \_\_\_\_\_ Transfer

National Stud #    Sex    Birth Date    Sire    Dam    Location    Date    Local ID    Event    Name    Old National International Stud#    Stud #

**Released in Wildlife sanctuaries Gorumara and Jaldhapar, W.Bengal.**

76	M	~ Jan 1987	WILD	WILD	INDIA	~ 1987	NONE	Capture	RATUL	NR028	174
					ASSAM	25-Aug-87		Transfer			
					GORUMARA	17-Oct-95		Transfer			
83	M	~ Jun 1989	WILD	WILD	INDIA	25-Jul-89	NONE	Capture	MADU		178
					ASSAM	26-Jul-89		Transfer			
					JALDHAPAR	17-Oct-95		Transfer			

National		Sex		Birth Date		Sire		Dam		Location		Date		Local ID		Event		Name		Old National International	
Stud #																				Stud#	Stud #
Totals: 1.0																					
<b>National Zoological Park, N.Delhi</b>																					
93	M			27-Dec-92	26			65		DELHI			27-Dec-92				Birth	AYODHYA		NR044	202
100	F			27-Nov-97	26			65		DELHI			27-Nov-97				Birth	MAHESHWARI		NR046	252
Totals:																					
Total 1.1.0 (2)																					
<b>Nehru Zoological Park, Hyderabad</b>																					
13	F			~ 1963		WILD		WILD		INDIA		???	???				Capture	PADMA		NR004	77
Totals:																					
34	F			~ May 1973		WILD		WILD		INDIA		???	???				Capture	MAYA		NR008	128
Totals:																					
78	M			17-Jun-87		37		34		KANPUR			17-Jun-87				Birth	MOHIT		NR029	140
Totals:																					
Total: 1.2.0 (3)																					
<b>Kanpur Zoo, Kanpur, U.P</b>																					
85	M			20-Jun-89		37		34		KANPUR			20-Jun-89				Birth	ROHIT		NR036	160
108	F			26-Jun-94		62		80		PATNA			26-Jun-94				Birth	RANI			
Totals:																					
113	F			22-Jun-02		78		108		KANPUR			22-Jun-02				Birth	MANU			

Old  
National International  
Stud# Stud #

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	National Stud#	International Stud #
<b>Total: 1.2.0 (3)</b>											
<b>Lucknow Zoological Park, Lucknow, UP</b>											
72	M	6-Aug-84	37	34	KANPUR	6-Aug-84		Birth	LOHIT		129
					DUDHWA	27-Apr-92		Transfer			
						25-Nov-92		Transfer			
					LUCKNOW	6-Apr-95		Transfer			
<b>Total: 1.0.0 (1)</b>											
<b>Nandankanan Biological Park, Orissa</b>											
38	F	~ Jun 1974	WILD	WILD	INDIA	~ 1974	NONE	Capture	NUMALI		153
					ASSAM	16-Sep-74		Transfer			
					NANDANKAN	4-Apr-76		Transfer			
47	M	~ 1977	WILD	WILD	INDIA	~ 1977	NONE	Capture	NANDAN		
					ASSAM	22-Aug-77		Transfer			
					NANDANKAN	29-Nov-79		Transfer			
<b>Total: 1.1.0 ( 2)</b>											
<b>Patna Zoo, Bihar</b>											
49	M	~ Apr 1977	WILD	WILD	INDIA	~ 1977	NONE	Capture	KANCHHA		156
					ASSAM	19-Aug-77		Transfer			
					PATNA	25-May-79		Transfer			
80	F	8-Jul-88	62	36	PATNA	8-Jul-88		Birth	HARTALI		159
92	F	8-Jul-91	62	36	PATNA	8-Jul-91		Birth	CHOTKI		203
107	M	19-Dec-93	49	36	PATNA	19-Dec-93		Birth	RAJA		
111	M	29-Sep-00	49	80	PATNA	29-Sep-00	UNK	Birth	BHOPO		

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National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National Stud #	International Stud #
IN8	M	????	WILD	WILD	INDIA LUCKNOW	~ 1959 30-Mar-59 6-May-79	NONE	Capture Transfer Death	JASISNGH		90
IN9	F	????	WILD	WILD	INDIA LUCKNOW	~ 1944 2-Apr-44 2-Apr-73	NONE	Capture Transfer Death	ROSY		105
<p><b>Total: 70.53.0 (123)</b></p>											

Compiled by: Anupama Koliyal thru P igrmy Hog Breeding Center  
 Data current thru: 30 Sep 2002 National (Indian) , using Sparks v1.52

**Section 2**  
**CURRENT LIVING POPULATION OF GREATER ONE HORNED RHINOCEROS (*Rhinoceros unicornis*) As on 30<sup>th</sup> SEPTEMBER 2003**

National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	National Stud#	International Stud #
<b>Assam State Zoo, Guwahati.</b>											
31	M	~ 1972	WILD	WILD	INDIA ASSAM	~ 1982 15-Jul-82	NONE	Capture Transfer	GANESH Jr	NR006	172
44	M	~ 1976	WILD	WILD	INDIA ASSAM	~ 1980 27-Jan-80	NONE	Capture Transfer	LAKSMAN	NR012	168
58	M	~ Apr 1980	WILD	WILD	INDIA ASSAM	~ 1980 23-Aug-80	NONE	Capture Transfer	JOHNI PALIT	NR019	170
77	M	11-May-87	44	50	ASSAM	11-May-87		Birth	BISHNU	NR030	173
82	M	30-Mar-89	44	50	ASSAM	30-Mar-89		Birth	MOHESH BAGHEKH	NR034	176
89	F	~ 1990	WILD	WILD	INDIA ASSAM	~ 1991 10-Aug-91	NONE	Capture Transfer	ATI	NR039	192
112	F	4-Jun-02	77	89	ASSAM	4-Jun-02		Birth	PARI		
<b>Total</b>											
<b>8</b>											
<b>Zoological Garden, Alipore, W.Bengal</b>											
32	F	~ 1973	WILD	WILD	INDIA ASSAM	~ 1974 22-Jan-74	NONE	Capture Transfer	MAYURI	NR007	95
<b>Total : 0.1</b>											
<b>9</b>											
<b>M.C. Zoological Park, Chatbir, Punjab</b>											
75	M	9-May-86	43	27	CHATBIR Z	9-May-86		Birth	RAJAV/PRINCE	NR027	

National										Old National International	
Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Stud #	Stud #
104	M	~ Jul 1998	WILD	WILD	INDIA ASSAM	~ 1998 26-Oct-98 15-Mar-03	NONE	Capture Transfer Death	LOHAMANI		
105	F	????	WILD	WILD	INDIA ASSAM CALCUTTA TOKOYO	???? 6-Jun-61 16-Jul-61 13-Dec-91	NONE	Capture Transfer Transfer Transfer Death	LAUIE/RANI		21
106	F	????	WILD	WILD	INDIA ASSAM OMAHA	~ 1968 29-Jul-68 23-Jan-70 31-Jan-70	NONE	Capture Transfer Transfer Death	GOTANGI		48
107	M	19-Dec-93	49	36	PATNA	19-Dec-93		Birth	RAJA		
108	F	26-Jun-94	62	80	PATNA KANPUR	26-Jun-94 6-Oct-97		Birth Transfer	RANI		
109	M	23-Oct-97	49	80	PATNA	23-Oct-97 17-Jul-99		Birth Death	BAJRANGI		
110	M	2-Jul-00	26	65	DELHI	2-Jul-00 2-Jul-00		Birth Death			
111	M	29-Sep-00	49	80	PATNA	29-Sep-00	UNK	Birth	BHOPO		
112	F	4-Jun-02	77	89	ASSAM	4-Jun-02		Birth	PARI		

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National Stud #	Sex	Birth Date	Sire	Dam	Location	Date	Local ID	Event	Name	Old National Stud #	International Stud #
113	F	22-Jun-02	78	108	KANPUR	22-Jun-02		Birth	MANU		
114	F	8-Aug-02	49	80	PATNA	8-Aug-02		Birth	AKANSHA		
IN1	M	????	WILD	WILD	INDIA	????	NONE	Capture	KASI		1
					ASSAM	????		Transfer			
					MYSORE	24-Apr-65		Transfer			
						30-Apr-79		Death			
IN2	F	????	WILD	WILD	INDIA	????	NONE	Capture	RANI		11
					ASSAM	????		Transfer			
					MYSORE	15-Jun-56		Transfer			
						7-May-92		Death			
IN3	M	16-Apr-71	IN1	IN2	MYSORE	16-Apr-71		Birth	VINU		53
					GELSNKRKN	28-Aug-75		Transfer			
					TORONTO	28-Jul-76		Transfer			
					NY BRONX	30-May-90		Transfer			
IN4	M	????	WILD	WILD	INDIA	????	NONE	Capture	LACIT		62
					ASSAM	????		Transfer			
					VEERMATA	14-Apr-52		Transfer			
						14-Sep-80		Death			
IN5	M	????	WILD	WILD	INDIA	~1974	NONE	Capture	JAYA		64
					ASSAM	3-Jan-74		Transfer			
					NAGOYA	2-Oct-74		Transfer			
IN6	F	~1953	WILD	WILD	INDIA	~1953	NONE	Capture	KUSHAL		75
					MADRAS	9-Jun-53		Transfer			
					NY BRONX	15-Jun-80		Death			
IN7	F	19-Jul-75	IN1	IN2	MYSORE	19-Jul-75		Birth	INDIRA		79
					GELSNKRKN	25-Jun-76		Transfer			
					TORONTO	27-Apr-79		Transfer			