NATIONAL STUDBOOK

Stump Tailed Macaque (*Macaca arctoides*)

II Edition

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Wildlife Institute of India

केन्द्रीय चिड़ियाघर प्राधिकरण
Central Zoo Authority

National Studbook of
Stump Tailed Macaque (*Macaca arctoides*) II Edition

Part of the Central Zoo Authority sponsored project titled "Development and Maintenance of Studbooks for Selected Endangered Species in Indian Zoos" awarded to the Wildlife Institute of India vide sanction order: Central Zoo Authority letter no. 9-2/2012-CZA(NA)/418 dated 7th March 2012

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FOREWORD

Stump-tailed macaque, primarily a terrestrial primate species inhabits evergreen forests south of the river Brahmaputra. Various anthropogenic factors have led to population declines across its range. Ex-situ measures coupled with in-situ interventions offer an opportunity for ensuring its long-term survival. Scientific management based on pedigree information contained in studbooks forms the basis for effective ex-situ conservation of the species for ensuring their long term genetic viability and demographic stability.

The Central Zoo Authority (CZA) in collaboration with zoos in India has initiated a conservation breeding program for threatened species in Indian zoos. As a part of this endeavor a Memorandum of Understanding has been signed with the Wildlife Institute of India for compilation and update of studbooks of identified species in Indian zoos.

As part of the project outcomes the WII has compiled the studbook for Stump tailed macaque (*Macaca arctoides*) II Edition in Indian zoos. The recommendations contained in the studbook will form the basis for the long term management of the species in captivity. It is hoped that the zoos will adopt the recommendations and keep the WII informed of changes in their populations to enable the timely update of the studbook.

(Dr. D. N. Singh, I.F.S.)
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Bokaro Steel Plant Zoo, Bokaro
Indira Gandhi Zoological Park, Visakapatnam
Kamla Nehru Zoological Garden, Ahmedabad
Kanpur Zoological Park, Kanpur
Lady Hydari Park Animal Land, Shillong
Lucknow Zoological Garden, Lucknow
MahendraChaudhury Zoological Park, Chhatbir
Manipur Zoological Garden, Imphal
National Zoological Park, New Delhi
Nehru Zoological Park, Hyderabad
Sanjay Gandhi Biological Park, Patna
Sayajibaug Zoo, Vadodara
Sri Venkateswara Zoological Park, Tirupati

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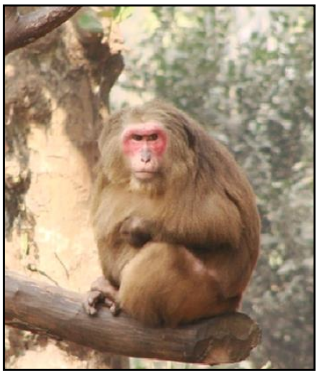
STUMP TAILED MACAQUE

(*Macaca arctoides*)

Species Information

The stump-tailed macaque, also called the bear macaque, is a primate species found in South Asia including north-east India. They have long, thick, dark brown fur except for a naked face and short tail. Primarily frugivorous, they however also feed on many types of vegetation, such as seeds, leaves and roots, and small animals such as freshwater crabs, frogs, bird eggs and insects.

Taxonomy	
Phylum	Chordata
Subphylum	Vertebrata
Class	Mammalia
Order	Primates
Family	Cercopithecidae
Subfamily	Cercopithecinae
Species	*Macaca arctoides*



Stump-tailed macaques (*Macaca arctoides*) are one of the most distinctive species among macaques, and their phylogenetic position has been controversial (Delson 1980; Fooden 1976; Hayasaka *et al.* 1996; Tosi *et al.* 2003). Based on morphological characteristics, Fooden(1980) classified macaques into four species groups: *silenus-sylvanus* group, including Barbary (*M. sylvanus*),lion-tailed *(M. silenus),* and pig-tailed macaques *(M. nemestrina)* and species of Sulawesi macaques (*M. Nigra* and *M. tonkeana*); *sinica* group, including toque (*M. sinica*), bonnet (*M. radiata*), Assamese (*M. assamensis*), and Tibetan macaques (*M. thibetuna*); *arctoides* group, including stump-tailed macaque(*M. arctoides*); and *fascicularis* group, including Japanese (*M. fuscata*), rhesus (*M. mulatta*), Taiwanese (*M. cyclopis*), and crab-eating macaques (*M. fascicularis*).Delson (1980) modified the classification by removing *M. Sylvanus* from *silenus* group to form a sister taxon to all of the Asian groups and suggested that *M. arctoides* should be included in the *sinica* group since modifications of the glans penis in *M. arctoides* represent an extreme of the sagittate form already present in the *sinica* group.

There has been an unusual discrepancy regarding the position of *M. arctoides* between the mtDNA and the nuclear DNA topologies. Studies based on mt-DNA data indicate that *M. arctoides* is more closely associated with the *fascicularis* group than the *sinica* group and should be classified into the *fascicularis* group (Hayasaka et al., 1996; Tanaka and Takenaka, 1996; Morales and Melnick, 1998; Tosi et al., 2003; Li and Zhang, 2005). On the contrary, macaque phylogenetic analyses based on

nuclear DNA markers, including Y-chromosomal and autosomal genes, are in agreement with morphological studies in assigning *M. arctoides* to the *sinica* group (Tosi *et al*. 2000, 2003; Deinard and Smith, 2001).

Tosi *et al.* (2000, 2003) suggested a possible hybrid origin of *M. arctoides.* They concluded that extensive hybridization between proto-*M. Assamensis* / *thibetana* and proto-*M. fascicularis* in a Pleistocene forest refugium may have given rise to a unique entity that is *M. arctoides.* A study based on Alu insertions by Li *et al.* (2009) also supports a close relationship between *M. arctoides* and the *sinica* group.

Morphology

Stump-tailed macaques (*Macaca arctoides*) have a variety of pelage colours in different shades of red, brown, and black (Fooden 1990). Based on pelage colour and geographical distribution, Lekagul and McNeely (1988) classified them into 2 subspecies: northern populations from southern China to northern Thailand, with bright brown pelage — *Macaca arctoides arctoides*— and southern populations, that inhabit the lower latitudes of Southeast Asia, with black pelage- *M. a. melanota*. However, different colour variants in *Macaca arctoides* have been seen to coexist within same populations of southern (Fooden 1990) and western Thailand (Malaivijitnond and Hamada 2005) and hence have not been classified as sub species (Fooden 1990; Koyabu *et al*. 2008).

Newborns have pale pink faces, but become dark red or black as they age (Malaivijitnond and Hamada 2005). Adult macaques are hairless on their hands, feet, faces and stumpy hamster-like tails. Older stump-tailed macaques, like older humans, suffer from baldness on their heads.

Males are larger and heavier than females. Males grow up to 10.2 kg while females weigh 7.5 kg. Males grow to 25.59 inches long (58.5 cm) while females are 19.09 inches (48.5 cm). Tail lengths vary considerably, irrespective of gender. Tails have been recorded with lengths from 1.26 to 2.72 inches (32 to 69 mm) Males also sport prominent canine teeth, which they bare at intruders and rival males.

Distribution

Stump-tailed macaques (*Macaca arctoides*) have been reported to be distributed primarily in the hilly areas of Southeast Asia, ranging from southeast of the Brahmaputra river, in north eastern India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura provinces), to northern Myanmar, and south western China (Guangdong, Guangxi, Guizhou, and Yunnan provinces) and throughout Thailand, Lao PDR, Vietnam, Cambodia, north western Malaysia (Htun *et al*. 2008). Stump-tailed macaque populations are thought to be absent from most parts of Thailand (Htun *et al.* 2008) and appear to be locally extinct in Bangladesh (Molur *et al*. 2003). It was last recorded in1982 and 1989 and field studies since then have not revealed their presence (Molur *et al*. 2003).

Srivastava and Mohnot (2001) and Chetry *et al.* (2003) report possible records of the species from Namdapha National Park, though they were morphologically distinct from other representatives of the species, and could represent an undescribed subspecies (Htun *et al*. 2008).

Figure 1: Geographic range of Stump tailed macaques (Source: Htun*et al.* 2008)

Habitat

The natural habitat of Stump-tailed macaques consists of subtropical and tropical broadleaf evergreen forest (Fa 1989). They are found in lowland forests, monsoon forests, dry forests and mountain forests of India, which are upto 2000 m in altitude. Stump-tailed macaques are sympatric with long-tailed macaques in the Wat Tham Khao Daeng National Park in Thailand and use the same provisioned food resource (Malaivijitnond and Hamada 2005). They are known to be sympatric with four other species of macaques (*M. fascicularis, M. mulatta, M. assamensis and M. Nemestrina leonina*) found in Thailand (Fooden 1982, Fooden 1990). He considered that the sympatry between stump-tailed and long-tailed macaques was facilitated by ecological habitat separation. Stump-tailed macaques are restricted to the broadleaf evergreen forest, while the long-tailed macaques inhabit the non-broadleaf evergreen forest (Fooden 1980). No interspecific association between the two species has been observed at Wat Tham Khao Daeng, although they fed at the same site within a very short time interval of one another (Malaivijitnond and Hamada 2005). It was reported that in the provisioned situation long-tailed macaques appeared to avoid the stump-tailed macaques.

Behavioural ecology

Activity patterns

Stump tailed macaques are considered arboreal as well as terrestrial, and are diurnal in habit. They feed primarily on seeds and fruits. They spend the early morning, until midday, travelling and feeding. In the afternoon they stop to take rest in the shade, spending time on social activities such as grooming while juveniles and adolescents play (Fooden *et al.* 1985).Home range is unknown but thought to be several square kilometres (Srivastava 1999). Though they spend the majority of the day travelling on the ground, usually along the banks of rivers and streams, stump-tailed macaques also forage for fruits and leaves and flee to trees when in danger (Fooden 1990).

Foraging and feeding behaviour

Stump tailed macaques feed on fruits, seeds, insects, small vertebrates and young leaves (Smith *et al.*2008). As in other macaques they possess cheek pouches to carry food while foraging. The Mexican stumptails hunt spiders, worms, snails, insects, frogs, lizards, birds and field mice and also search out

turtle and bird eggs (Fooden 1990). They are also known to raid crops preferring corn and other cultivated fruits. Foraging takes place starting in the morning through midday. Foraging begins again in the late afternoon as they travel to their sleeping site, usually large trees or cliffs. The daily range of stump-tailed macaques is between two and three kilometres, but is restricted during the rainy season when food is in abundance.

Social and breeding behaviour

Stump-tailed macaques (*Macaca arctoides*) live in multimale, multifemale social groups with troop sizes varying from 10 to 60 individuals (Fooden 1990). They live in female bonded social groups with the core of the group consisting of related females that develop preferential relationships and support each other during conflicts (Thierry 2007). Neighbouring groups have typically overlapping home ranges, females form kin-bonded subgroups (or matrilines) within their natal groups and most males usually disperse at sexual maturity (Thierry 2007).

Stump tailed macaques show extreme variability in social behaviour, especially in sexual behaviour (Chevalier-Skolnikoff 1974). Grooming behaviour is correlated with dominance rank, and adults holding adjacent ranks tend to interact with each other more (Estrada 1976). Male grooming of the female is lowest before menstruation, and female grooming of the male declines sharply after ovulation.

In stump tailed macaques, both sexes solicit mating (Chevalier-Skolnikoff 1974). A male solicits a female by approaching and staring at her and displaying teeth chattering facial expression (Brereton 1989). A female solicits by approaching a male and presenting her hindquarters, while maintaining eye contact throughout.

Stump tailed macaque is an exception to the *Macaca* genus, as females of this species lack prominent sexual swellings (Fooden 1990). The loss of sexual swellings in females could be a strategy to confuse paternity, or an attempt to reduce the energetic cost of maintaining the trait, as suggested by Fooden (1990) and or alternatively to decrease chances of infanticide (Hrdy1979). Despite the lack of sexual swellings, males are able to detect the female receptive phase, made obvious by an increase in copulations and male–male agonistic encounters (Shively *et al*. 1982; Murray *et al.* 1985). Although females lack specialized glands near the perineal region to signal their reproductive status chemically (Fooden 1990), male stump-tailed macaques are able to detect female reproductive phases through chemicals within vaginal secretions, as well as through behavioural solicitations (Cerda-Molina *et al.* 2006). A large amount of time is spent by males in inspection—visual, oral, olfactory, and/or tactile—of the females' perineal region (Bertrand 1969; Fooden1990).

Menstrual cycle in stump tailed macaques last for 28 days and most males copulate throughout almost the entire menstrual cycle, with the α males monopolizing to a greater extent their access to females during the peri-ovulatory period (Murray *et al*.1985).

Males are single mount ejaculators and they lip-smack and bark while mounting. Copulation is divided into 3 phases, the pre ejaculatory, ejaculatory and post ejaculatory phases (Chevalier-Skolnikoff 1974).

During copulation, adult as well as sub-adults (in particular) of both sexes, tend to harass the copulating pair (Gouzoules 1974). Besides copulation, stump tailed macaques display greater variety of socio sexual behaviour than other macaque species, such as sniffing, fingering, and mounting of the perineal region, probably since they have to rely mostly on non-visual cues to assess female reproductive status (Linnankoski *et al*. 1981).Males are extremely tolerant to infants, while the latter show no fear toward males (Estradaand Estrada 1984). Adult males in captivity have been seen to lip smack at infants (Blurton-Jones and Trollope 1968) and they often use infants to regulate their relationship with other troop members, especially during fights, also termed as "agonistic buffering" (Gouzoles1974). Infant care by males is inversely related to the age of infants (Estrada and Estrada 1976). In stump tailed macaques infants generally hold dominance ranks immediately lower than their mothers and these dominance patterns often guide the course of infant care by males (Mitchell 1969). However, infanticide in captive conditions have been reported by Solanki and Zothansiama (2013), whereby the infanticidal β-male mated with the victim's mother and increased its chances to sire the subsequent infant.

Stump tailed macaques display a variety of visual and tactile signals. Most gestural signals in Stump tailed macaques are associated with dominance and submission rather than social bonding (Maestripieri 1996). Hind quarter presentation is a common form of gestural communication, displayed mostly by sub-ordinates to appease dominant members. Other forms of submissive signals include bared-teeth, lip-smack, teeth-chatter, and presenting their arm to be gently bitten off to communicate submission to a dominant individual (Estrada *et al.* 1977). Aggressive behaviour is often displayed by mock biting, while female bonding is displayed by a ventro-ventral embrace. Other forms of behaviour indicating dominance, submission or protection are non-thrusting mount, hip touch, hip clasp, and genital manipulation. Stump tailed macaques respond to the presence of predators through alarm calls (Estrada and Estrada 1976).

Fooden *et al.* (1985) reported that Stump tailed macaques in Yunnan, China mated throughout the year with a peak in October-November, and births in May-June. In India, mating in captive Stump tailed macaques have been reported to peak during October to December and is negligible during April to May. However, lack of a seasonal mating cyclicity has been reported by studies on birth patterns in stump-tailedmacaques living under laboratory or freerangingconditions (Smith 1984). The average age at first reproduction is 4.9 years and they have an average gestation length of 176.6 days (Nieuwenhuijsen *et al*. 1985).

Table 1: Life history traits of Stump tailed macaques

Mating System	Polygynandrous (promiscuous)
Age at sexual maturity	4.9 years in captivity(Nieuwenhuijsen *et al*. 1985)
Breeding season	Non-seasonal (Smith 1984)
Number of offspring	1 (Smith *et al*.2008)
Average gestation period	176.6 days (Nieuwenhuijsen *et al*. 1985)
Inter birth interval in captivity	23 ± 2 months (Solanki and Zothansiama 2013)
Weaning age	7 months (Nieuwenhuijsen *et al*. 1985)
Lifespan	Maximum longevity in captivity 29.2 years (Weigl 2005); have shorter life spans in the wild (Choudhury 2002)

Population status in the wild

Populations in South Asia and in Myanmar are few and fragmented (Molur *et al.* 2003). The species is suspected to be extinct in Bangladesh, having last been recorded there in 1989. It is very scarce all over its range in north-eastern India (Choudhury 2001). However, it is common in the mountains of Nagaland, Manipur, and eastern Mizoram (Choudhury 2001). In China the species is still common in Yunnan, though the populations are thought to be lower in the eastern portions of its range (Zhang *et al*. 2002). Populations of this species are critically threatened in India, declining in Myanmar, stable in Thailand, and declining rapidly in China and Viet Nam. There are some declines in Lao PDR and Cambodia. Future declines are predicted to be faster in Lao PDR, Viet Nam, India, Myanmar and China due to habitat loss and/or hunting.

Threats and conservation status

Major threats to *M. arctoides* throughout its range were reported to be habitat disturbances (such as selective logging, timber and firewood collection for charcoal and infrastructure development), hunting for food, sport and traditional medicine, and accidental mortality due to trapping (Molur *et al*. 2003; in: Htun*et al,* 2008).

Macaca arctoides has been listed in CITES Appendix II since 1977. Globally, reported trade in *M. arctoides* 2000-2007 was also low, consisted primarily of live animals for circuses, travelling exhibitions and zoos, and specimens for scientific and biomedical research. The only reported trade in live, wild-sourced animals was the import of four *M. arctoides* by Mexico from Cuba in 2003.

It is listed as Vulnerable in the IUCN Red List of threatened species (2008), due to reduction in the past and projected decline by at least 30% over the coming 30 years (three generations) due to primarily hunting and continued rates of habitat loss (mainly as a result of logging and timber extraction) (Htun *et al*. 2008).Roonwal and Mohnot (1977) considered that *M. arctoides* was uncommon all over its range (Southwick and Siddiqi, 1970).Htun*et al.* (2008) reported that populations in South Asia and in Myanmar are few and fragmented (Molur*et al.,* 2003) and that the overall population trend of the species was decreasing'.According to surveys of the Indo-US Primate project, NE centre, the species has been categorised as Critically Endangered (Walker and Molur 2004).

Status in Captivity

The species is held at 23 institutions globally with a total of 9 (45.43.2) specimens across four regions, while 5 institutions house 11 (3.7.1) specimens in India according to the ZIMS database (June 12th 2018). The CZA inventory (Table 2) indicates the presence of 43 (19.22.2) specimens,at 9 Indian zoos while the data

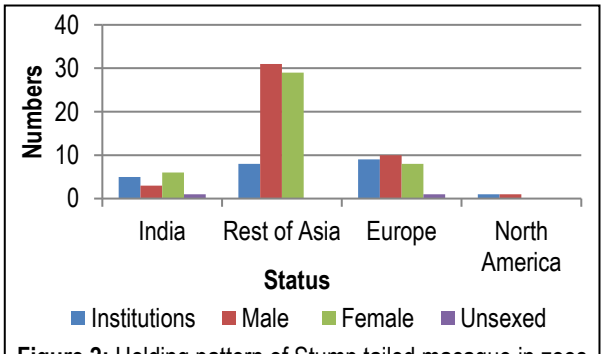


Figure 2: Holding pattern of Stump tailed macaque in zoos

(current till March 2018) that was made available by holding zoos for the compilation of the studbook includes 45 (19.25.1) specimens at 9 locations.

Table 2: Status of stump tailed macaque in zoos

Zoo Name	Species360				CZA Inventory				Studbook			
	Male	Female	Unsexed	Total	Male	Female	Unsexed	Total	Male	Female	Unsexed	Total
Aizawl Zoological Park, Aizawl	0	0	0	0	12	11	1	24	12	11	1	24
Assam State Zoo and Botanical Garden, Guwahati *	2	5	0	7	2	5	0	7	2	6	0	8
Aurangabad Municipal Zoo, Aurangabad	1	0	0	1	0	0	0	0	0	0	0	0
Indira Gandhi Zoological Park, Visakapatnam	0	0	0	0	0	1	0	1	0	1	0	1
Jawaharlal Nehru Biological Park, Bokaro *	0	0	0	0	0	0	0	0	1	1	0	2
Lady Hydari Park Zoo in Shillong	0	0	0	0	0	1	0	1	0	1	0	1
Marble Palace Zoo !	0	0	0	0	1	0	0	1	0	0	0	0
Miao mini zoo	0	0	0	0	1	1	0	2	1	1	0	2
Nagaland Zoological Park, Rangapahar	0	0	0	0	3	1	1	5	3	2	0	5
Nehru Zoological Park, Hyderabad	0	1	0	1	0	1	0	1	0	1	0	1
NawabWazid Ali Shah Zoological Gardens	0	1	0	1	0	1	0	1	0	1	0	1
Sri Venkateswara Zoological Park, Tirupati	0	0	1	1	0	0	0	0	0	0	0	0
Total	**3**	**7**	**1**	**11**	**19**	**22**	**2**	**43**	**19**	**25**	**1**	**45**

* Data entered in SPARKS database based on information provided by holding zoos

! No data provided by zoo; not entered in SPARKS database

Methods

Data on individual history was collected by means of questionnaires, zoo visits and from the websites of CZA and Species360. Questionnaires were sent to the institutions housing Stump tailed macaque in India, requesting information for each captive specimen. Data was entered in the Single Population Analysis and Records Keeping System (SPARKS *v* 1.66) (ISIS 2004) and subsequently exported to population management programme PMx*v* 1.2 (Ballou *et al.,* 2011) for further analysis.

Scope of the Studbook

- The studbook includes all specimens present in Indian zoos for which records were available from holding institutions. Efforts were made to retrieve information on their holding from the taxon report of the species from the Species360 website for institutions from which records were not received.

- The CZA inventory was used as a benchmark for population estimates;however,data entered in the SPARKS database (Table 1) was on the basis of information made available by holding zoos.
- The mnemonics present in the SPARKS software were used as names for individual institutions; while for those institutions for which mnemonics were not present in the SPARKS Software, the same were assigned based on their location listed on the CZA Website and the same are listed in the location glossary (Appendix IV). The mnemonic India was used for all specimens acquired from the wild.

Analysis

Demographic Status

Historical Population

The studbook includes a total of 113(60.52.1) specimens that have been housed at 17 Indian zoos. The first recorded entry of the species in captivity was at Kanpur Zoological Park in 1974, with two pairs of wild origin animals being acquired by the zoo. Growth in the population has been primarily due to entry of wild origin specimens that form approximately 60% of the captive population, while births in captivity account for 36% of the total population. The captive births are attributed to 23(11.12) approximately 21% of the captive population. Figure 3 and Table 3 summarize the trends of the historical population while Annexure I includes detailed event-wise information on individual specimens.

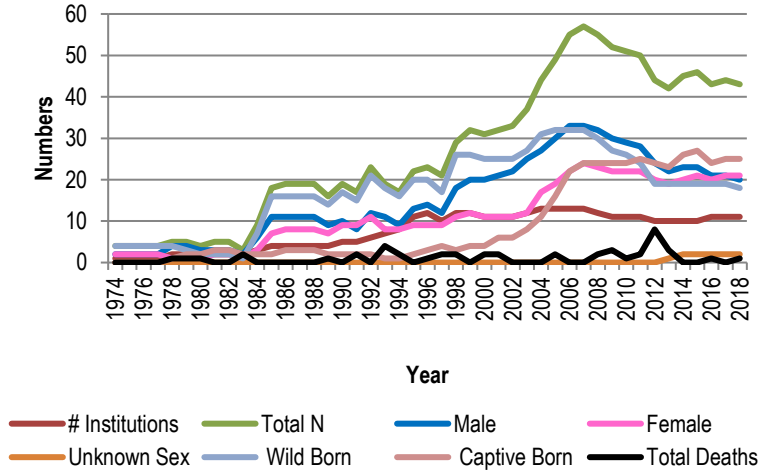


Figure 3: Census trends of the captive population

Table 3: Summary of the Historical Population

	Males	Females	Unknown	Total
Studbook size	60	52	1	113
Acquisition from wild	39	29	0	68
Captive births	19	21	1	41
Unknown origin	2	2	0	4
Deaths	33	20	0	53
Breeding individuals	11	12	0	23
Lost to follow up/ released	8	7	0	15

Living Population

The living population includes 45 (19.25.1) specimens housed at 9 institutions; with 21 (10.11.0) wild origin specimens. Only 21% or 10 (5.5) animals are proven breeders in the living population. Table 4 summarizes the status of the living population while Annexure II provides location-wise specimen

details of the living individuals. A perusal of Table 1 and Annexure II reveals the presence of 53% of the population at a single location (Aizawl Zoological Park).

Table 4: Summary of living population

	Males	Females	Unknown	Total
Living	19	25	1	45
Wild-born	10	11	0	21
Captive-born	9	14	1	24
Breeding	5	5	0	10

Population Vital Rates

Table 5: Vital rates of the captive population

	Males	Females	Total
λ: Population growth rate	0.954	0.950	0.952
T: Generation time	7.9	6.2	7.0
N 20: Projected population after 20 years	10.5	15.3	25.8

The population is currently declining at a rate of approximately 4% annually with males showing a marginally faster decline. The captive population has a generation time of 7 years. The declining population trend is also reflected in the projected population after 20 years with a decline of 19 individuals in the population. The accuracy of the life table analysis carried out to arrive at the conclusions is limited by the small size of the captive population and the limitednumber of known age and sex specimens in the population.

Age Distribution

Age distribution of 44 (19.25) known age living specimens indicates a female bias. The living population includes 10 (3.7) animals of known age in reproductively active age classes (1 – 6 years for both males females based on analysis of studbook data Figure 4). An additional specimen of unknown sex is also present in the reproductively active age classes. The population also includes 11 (4.7) specimens of pre-reproductive age. It also shows the presence of 23 (12.11) specimens of either sex in the post reproductive age class. The age distribution pattern of the captive population indicates a population that is likely to decline at a much faster rate than predicted as the reproductively senescent individuals' form 51% of the population.

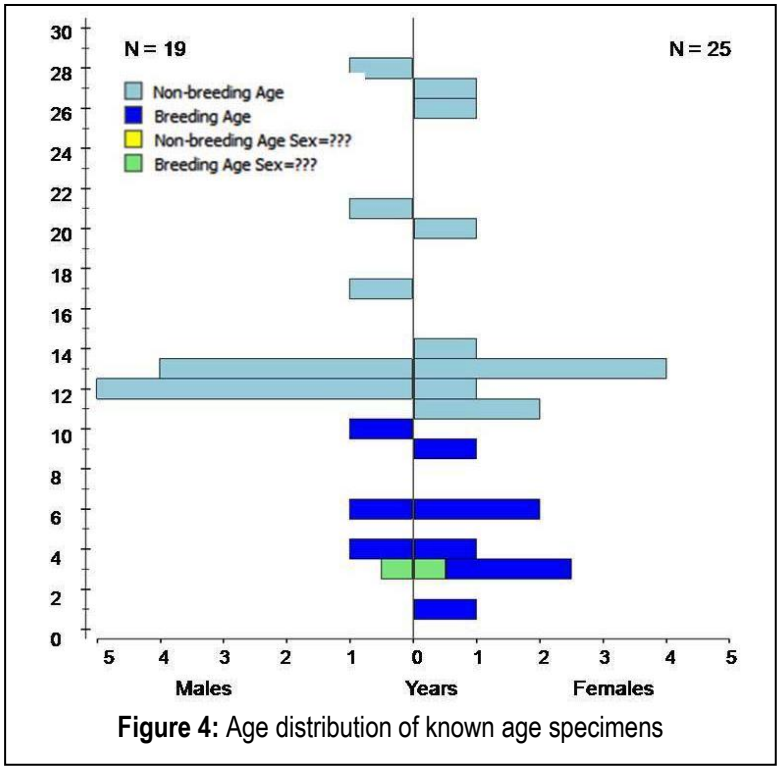


Figure 4: Age distribution of known age specimens

Genetic Status

Table 6 summarizes the genetic status of the living population. Analysis indicates that it originates from 9 founders although the population includes 68 (39.29) wild origin specimens. The living population of 45 specimens retains 91.77% of the genetic diversity of these 9 founder animals. The population has a large proportion of wild origin specimen in the living population21(11.10); howeverthe low reproductive output of wild origin specimens has resulted in the limited representation of the founder genome in the living population leading to the population having the founder genome equivalents of only 6.07 wild origin specimens.

Table 6: Genetic Summary of the current population

Genetic parameters	Current
Founders	9
Living Animals	45
Percent Ancestry Known	89%
Gene Diversity (GD)	0.9177
Founder Genome Equivalent (FGE)	6.07
Mean Inbreeding (F)	0.0233
Population mean kinship (Mk)	0.0823

Pairing Recommendations

Pairing recommendations (table 7) have been arrived at based on 'Mate Suitability Index' (Box 1 for details).Suggested pairings include mating between identified sires with multiple dams. For such pairings it is suggested that the animals be paired with identified mates at the location itself and then moved to the closest location housing the dam suggested for pairing. It is suggested that additional founders on acquisition be paired with specimens having over-represented lineages to ensure an equitable distribution of genetic diversity in the population.

Table 7: Pairing recommendations

Dam	Dam Location	Sire	Sire Location	F	dGD	MSI
53	Shillong	64	Aizawl	0.0000	0.0061	1
54	Aizawl	65	Aizawl	0.0000	0.0087	2
56	Aizawl	78	Aizawl	0.0000	0.0083	3
59	Aizawl	58	Aizawl	0.0000	0.0085	2
61	Assam	109	Kohima	0.0000	0.0126	1
62	Aizawl	89	Miao	0.0000	0.0172	1
67	Aizawl	86	Aizawl	0.0000	0.0167	3
70	Aizawl	58	Aizawl	0.0000	0.0164	3
74	Aizawl	78	Aizawl	0.0000	0.0157	4
75	Aizawl	86	Aizawl	0.0000	0.0150	4
82	Aizawl	86	Aizawl	0.0000	0.0140	4
83	Aizawl	86	Aizawl	0.0000	0.0133	3
84	Assam	81	Aizawl	0.0000	0.0133	4
85	Aizawl	78	Aizawl	0.0000	0.0131	3
97	Assam	109	Kohima	0.0000	0.0152	4
110	Kohima	112	Kohima	0.0000	0.0186	1
113	Kohima	111	Kohima	0.0000	0.0217	1

Box 1: Mate Suitability Index (MSI)

It is a numerical genetic assessment of a male-female pair that incorporates several variables into one ranking (MSI range is 1 to 7, with 1 being the most genetically beneficial).

The default value in the table is the *MSI* (Mate Suitability Index) value for each male –female pair. *MSI* is a composite score that integrates four genetic components into a single index:

Delta GD (dGD): Change in gene diversity (GD) of the population if one offspring is produced by the pair. Positive dGD increases the GD of the population, while negative dGD decreases GD.

Differences in MK values (MKDiff): Difference in the genetic value (mean kinship value) of the male and female. Breeding a pair with a large MKDiff is detrimental because it combines under-represented and over-represented genetic lines.

Inbreeding coefficient (F): Inbreeding coefficient of any offspring resulting from the pair (i.e., the kinship value for the pair). Inbreeding is considered to be detrimental to the fitness of the resulting offspring.

Unknown ancestry: The amount of unknown ancestry in the male and female. Incomplete pedigree information means that the genetic value and relatedness of a pair cannot be accurately calculated.

1 = very beneficial (genetically) to the population;
2 = moderately beneficial,
3 = slightly beneficial;
4 = slightly detrimental,
5 = detrimental, should only be used if demographically necessary
6 = very detrimental (should be considered only if demographic considerations override preservation of genetic diversity)
"-"= very highly detrimental (should not be paired, due to high level of kinship of pair)

Using Pairwise Info
The default table of *MSI* values for pairs can be used to quickly assess the relative genetic value of a pair, subset of pairs, potential mates for one individual, and many other valuable data when making breeding recommendations. This can be especially helpful to quickly explore options for pairing individuals at one facility that houses numerous individuals of each sex or to quickly identify an alternative suitable mate if a recommended breeding fails.

Source: Traylor-Holzer, K. (ed.). 2011.

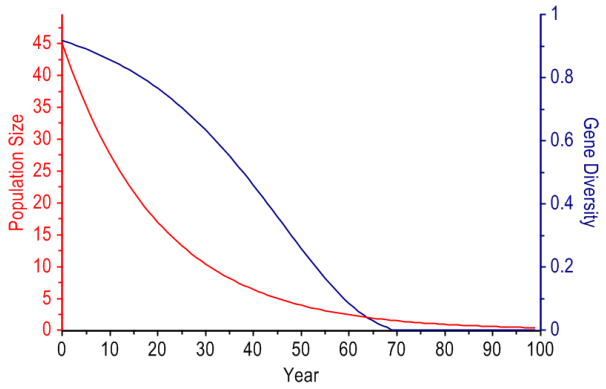
Targets for Population Management

The current captive population of stump tailed macaque includes 45 (19.25.1) individuals. It includes 21 (10.11) wild origin specimens of which 9 (5.4) are effective founders, while the remaining specimens are yet to contribute to the population. The population is currently decliningat the rate of 5% per annum (λ =0.952). The population retains a significant proportion of the genetic diversity (91.77% introduced from 9 founders). Achieving conservation goals for the population is thus of critical importance.

Multiple simulations were run using PMx to determine the fate of the current population for assessing the effect of management interventions that result in an increased population growth rate desired for achieving demographic stability and supplementation with effective founders for ensuring genetic viability; over the next 100 years. The outcomes of the scenarios that were run without change and with changes (supplementation with effective founders and increasing the population growth rate) that ensure a genetically viable and demographically stable population over the next 100 years are presented below.

Scenario I:

The simulation was run using the current population variables without supplementation with additional animals while retaining the current population size (45). The outcomes indicate that the population in captivity is likely to go extinct over the next 100 years with genetic diversity declining to 0.00% by the 70th year. The population variables used and the outcomes of the simulation are presented in Figure 5.



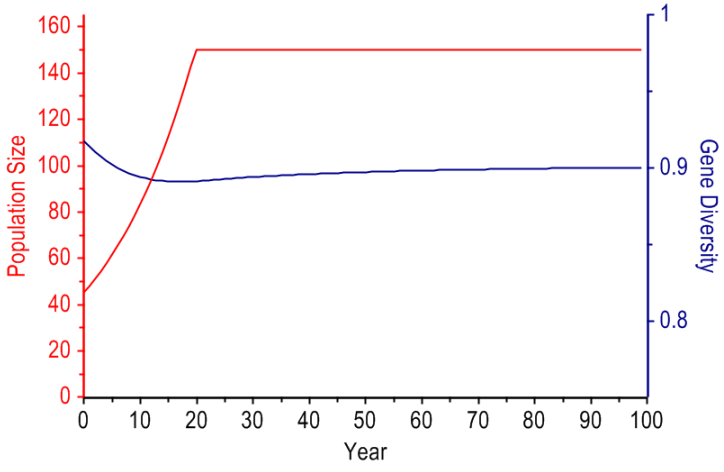
Population Variables:
Generation Length; 7.0
Maximum potential lambda; 0.9523
Current N; 45
Current Ne; 13.5
Ne/N; 0.30
Current Gene Diversity; 0.9177
Maximum N; 45
No founders added

Results:
Can maintain 90.0% for only 3 years; declining to 00.0% over the next 70 years.

Figure 5: Simulation outcomes without supplementation

Scenario II:

The outcomes of the simulation that was run using a growth rate of 6% per annum and a maximum population size of 150 specimens with supplementation by one effective founder every five years provided a population that was able to achieve the goals of maintaining 90% of the genetic diversity and a demographically stable population. The population and founder related variables, and the simulation outcome are presented as Figure 6. The increase in population growth rate can be achieved by ensuring that all reproductively active specimens get an opportunity to contribute to the growth of the population. The inclusion of additional effective founders should target lineages that are over-represented to ensure maximum genetic diversity in the captive population.



Population Variables:
Generation Length; 7.0
Maximum potential lambda; 1.0600
Current N; 45
Current Ne; 13.5
Ne/N; 0.30
Current Gene Diversity; 0.9177
Maximum N; 150

Founder Related Variables:
New founders per Addition event; 1
Year to start adding founders; 0
Years between events; 5
Year to stop adding founders; 100
FGE per Founder; 0.40
N per Founder; 1

Results:
Can maintain 90.5% for 100 years

Figure 6: Simulation outcomes with supplementation

Conclusions and Recommendations

Stump tailed macaquesface threats to their long term survival in their natural habitats across their distribution range and are accordingly listed in the Schedule I of the Wildlife Protection Act of India and as Vulnerable in the IUCN Redlist of threatened species (2008). The threats faced by the species remain operational and the populations across their range are showing declining trend. Maintenance of demographically stable and genetically viable *ex-situ* populations is thus crucial for ensuring the continued survival of the species.

A review of the status of the current captive population in Indian zoos based on analysis of available pedigree records indicates that the population is declining ($\lambda = 0.952$). The population remains biased towards females with a limited number of proven breeders, though a large proportion belong to reproductively active age classes. It however, retains a significant proportion of genetic diversity (91.77%) originating from a small founder base (9).

Simulations run using PMx software indicate that supplementation with oneeffective founder every five years and increasing the population growth rate to 1.060 and population size to 150 specimens in Indian institutions can ensure that the population remains viable over the next 100 years. The captive population of stump tailed macaque therefore requires intensive management efforts towards ensuring achievement of *ex-situ* conservation goals to address the following concerns:

- The population is maintained in a viable social group at only two zoos.
- The living population comprises of a large proportion of individuals in the pre-reproductive and reproductively active age classes; however, it is characterized by a declining trend.
- A large part of the genetic diversity captured from the wild has been lost due to poor reproductive performance in captivity.

Management interventions aimed at achieving conservation goals is thus critical to ensuring a genetically viable and demographically stable captive population. The following actions are suggested towards this end.

- Pooling of unviable social groups to form viable social groups using appropriate socialization process.
- Housing animals in sub-optimal conditions can lead to reduced reproductive output and higher mortality rates. A review of existing housing and husbandry practices is therefore suggested to identify and address existing shortcomings.
- The acquisition of founders needs to be based on identifying healthy individuals of reproductive or pre-reproductive ages to ensure optimum reproductive performance of the captive population.

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Annexure I

Historical listing of Stump tailed macaque (*Macaca arctoides*) in Indian zoos

Stud# Local ID Name Transponder	Sex	Birth Date	Sire	Dam	Location	Date	Event
1	M	????	WILD	WILD	INDIA KANPUR	26-Aug-74 26-Aug-74 ~ Jul 1980	Capture Transfer Death
2	F	????	WILD	WILD	INDIA KANPUR	26-Aug-74 26-Aug-74 08-Aug-79	Capture Transfer Death
3	F	????	WILD	WILD	INDIA KANPUR INDIA	28-Aug-74 28-Aug-74 ~ Aug 1978	Capture Transfer Death
4	M	????	WILD	WILD	INDIA KANPUR	28-Aug-74 28-Aug-74 19-Aug-83	Capture Transfer Death
5	M	????	WILD	WILD	INDIA AHMEDABAD	~ 1978 19-May-78 26-May-91	Capture Transfer Death
6	M	~ Aug 1978	1	2	KANPUR	~ Aug 1978 03-May-89	Birth Death
7	F	16-Jul-79	4	2	KANPUR	16-Jul-79 04-Dec-83	Birth Death
8	F	15-Apr-81	6	7	KANPUR	15-Apr-81 03-Nov-98	Birth Death
9	M	????	WILD	WILD	INDIA CHATBIR Z UNKNOWN	~ Mar 1984 ~ Apr 1984 18-Nov-89	Capture Transfer Ltf
10	F	????	WILD	WILD	INDIA CHATBIR Z UNKNOWN	~ 1984 ~ Apr 1984 18-Nov-89	Capture Transfer Ltf
11	F	????	WILD	WILD	INDIA CHATBIR Z	~ 1984 ~ Apr 1984 ~ 1993	Capture Transfer Death
12	M	????	WILD	WILD	INDIA CHATBIR Z	~ 1984 ~ Apr 1984 04-Jul-91	Capture Transfer Death
13	M	????	WILD	WILD	INDIA CHATBIR Z	~ 1984 ~ Apr 1984 03-Jun-93	Capture Transfer Death
14	M	????	WILD	WILD	INDIA CHATBIR Z	~ 1984 ~ Apr 1984 27-Jun-94	Capture Transfer Death
15	F	????	WILD	WILD	INDIA HYDERABAD VISAKAPAT	~ 1985 ~ 1985 14-Dec-86	Capture Transfer Ltf
16	M	????	WILD	WILD	INDIA HYDERABAD TIRUPATI	~ 1985 ~ Apr 1985 27-Apr-93 30-Aug-10	Capture Transfer Transfer Death
17	M	????	WILD	WILD	INDIA HYDERABAD UNKNOWN	~ 1985 ~ Apr 1985 04-Mar-94	Capture Transfer Ltf
18	M	????	WILD	WILD	INDIA HYDERABAD	~ 1985 ~ 1985	Capture Transfer

Stud# Local ID Name Transponder	Sex	Birth Date	Sire	Dam	Location	Date	Event
					TIRUPATI	20-Oct-97	Ltf
19	F	????	WILD	WILD	INDIA HYDERABAD UNKNOWN	~ 1985 ~ Apr 1985 04-Mar-94	Capture Transfer Ltf
20	F	????	WILD	WILD	INDIA HYDERABAD TIRUPATI	~ 1985 ~ 1985 27-Apr-93 14-Jan-11	Capture Transfer Transfer Death
21	F	????	WILD	WILD	INDIA HYDERABAD TIRUPATI	~ 1985 ~ Apr 1985 27-Apr-93 08-Feb-12	Capture Transfer Transfer Death
22	M	????	WILD	WILD	INDIA HYDERABAD VISAKAPAT	~ 1985 ~ 1985 20-Oct-97 ~ Oct 2013	Capture Transfer Transfer Death
23	M	????	WILD	WILD	INDIA HYDERABAD VISAKAPAT	~ 1985 ~ 1985 14-Dec-86	Capture Transfer Ltf
24 21	M	????	WILD	WILD	INDIA AHMEDABAD VADODARA	~ 1986 ~ 1986 14-Feb-87	Capture Transfer Ltf
25 22	F	????	WILD	WILD	INDIA AHMEDABAD VADODARA	~ 1986 ~ 1986 14-Feb-87	Capture Transfer Ltf
26	M	????	WILD	WILD	INDIA AHMEDABAD	~ 1987 28-Oct-87 08-Apr-96	Capture Transfer Death
27	F	????	WILD	WILD	INDIA AHMEDABAD	~ 1987 28-Oct-87 28-Nov-97	Capture Transfer Death
28	F	09-Jun-86	UNK	UNK	HYDERABAD	09-Jun-86 04-May-93	Birth Death
29	M	????	WILD	WILD	INDIA CHATBIR Z	~ 1990 30-Jun-90 ~ Oct 1996	Capture Transfer Death
30	F	????	WILD	WILD	INDIA CHATBIR Z	30-Jun-90 30-Jun-90 ~ 1993	Capture Transfer Death
31	M	02-Jul-89	UNK	11	CHATBIR Z	02-Jul-89	Birth Ltf
32	M	~ 1989	WILD	WILD	INDIA LUCKNOW	03-Mar-98 03-Mar-98 07-Mar-13	Capture Transfer Death
33 LACHIT	M	????	WILD	WILD	INDIA ASSAM	20-May-92 20-May-92 14-Mar-18	Capture Transfer Death
34	F	~ 1991	WILD	WILD	INDIA LUCKNOW	03-Mar-98 04-Mar-98	Capture Ltf
35 MIR	M	~ 1990	WILD	WILD	INDIA BOKARO	20-Jun-92 20-Jun-92	Capture Transfer
36	M	11-May-90	UNK	11	CHATBIR Z	11-May-90	Birth Ltf
37 PST02	F	15-Aug-90	WILD	WILD	INDIA BOKARO	15-Aug-90 15-Aug-90	Capture Transfer

Stud# Local ID Name Transponder	Sex	Birth Date	Sire	Dam	Location	Date	Event
MIRA							
38	M	~ 1990	WILD	WILD	INDIA LUCKNOW	03-Mar-98 03-Mar-98 ~ Oct 2014	Capture Transfer Death
39 SWAPNA	F	????	WILD	WILD	INDIA ASSAM	???? 21-Feb-92 31-Oct-98	Capture Transfer Death
40	F	~ 1992	WILD	WILD	INDIA LUCKNOW	03-Mar-98 03-Mar-98	Capture Transfer
41 33	F	????	WILD	WILD	INDIA SHILLONG	06-Jun-94 06-Jun-94 20-Jan-12	Capture Transfer Death
42	M	????	WILD	WILD	INDIA AURANGABA	11-Jul-95 11-Jul-95 17-Jan-09	Capture Transfer Death
43	M	????	WILD	WILD	INDIA IMPHAL	~ 1995 ~ 1995 17-Feb-08	Capture Transfer Death
44	M	31-Oct-94	UNK	UNK	ASSAM	31-Oct-94 31-Oct-94	Birth Death
45	M	????	WILD	WILD	INDIA CALCUTTA	~ Feb 1995 ~ Feb 1995 29-Jan-97	Capture Transfer Death
46	F	????	WILD	WILD	INDIA IMPHAL	~ 1995 ~ 1995 20-Feb-08	Capture Transfer Death
47 STM007 TARZAN 0006B76D36	M	05-Sep-96	WILD	WILD	ASSAM	07-Dec-96 07-Dec-96	Capture Transfer
48 STM2 BASANT STM2	F	????	WILD	WILD	INDIA PATNA	11-Aug-98 11-Aug-98 17-Aug-09	Capture Transfer Death
49	M	????	WILD	WILD	INDIA KANPUR	15-Sep-98 15-Sep-98 03-Nov-00	Capture Transfer Death
50 STM1 MANTOO	M	????	WILD	WILD	INDIA PATNA	11-Aug-98 11-Aug-98 17-Aug-09	Capture Transfer Death
51 STM3 RAJU	M	????	WILD	WILD	INDIA PATNA	11-Aug-98 11-Aug-98 26-Nov-01	Capture Transfer Death
52 JUNU	F	25-May-97	UNK	UNK	ASSAM	25-May-97 07-Jul-05	Birth Death
53 43	F	????	WILD	WILD	INDIA SHILLONG	12-May-98 12-May-98	Capture Transfer
54 102057520	F	????	WILD	WILD	INDIA AIZAWL	???? ????	Capture Transfer
55 44	M	????	WILD	WILD	INDIA SHILLONG	09-Mar-00 09-Mar-00 23-Sep-12	Capture Transfer Death
56 102057655	F	????	WILD	WILD	INDIA AIZAWL	???? ????	Capture Transfer
57	M	????	WILD	WILD	INDIA	????	Capture

Stud# Local ID Name Transponder	Sex	Birth Date	Sire	Dam	Location	Date	Event
10057736					AIZAWL	????	Transfer
58 981098100800311	M	????	WILD	WILD	INDIA AIZAWL	???? ????	Capture Transfer
59 102057656	F	????	WILD	WILD	INDIA AIZAWL	08-Aug-04 09-Aug-04	Capture Transfer
60 STM4 SONI	F	02-May-01	50	48	PATNA	02-May-01 12-Jun-12	Birth Death
61 KABITA 0006B7296F	F	????	WILD	WILD	INDIA SHILLONG ASSAM	22-Apr-03 22-Apr-03 28-Feb-05	Capture Transfer Transfer
62 102037520	F	????	WILD	WILD	INDIA AIZAWL	20-May-04 21-May-04	Capture Transfer
63	M	????	WILD	WILD	INDIA DELHI	~ 2004 ~ 2004 ~ Oct 2014	Capture Transfer Death
64 102057737	M	????	WILD	WILD	INDIA AIZAWL	05-Sep-05 07-Sep-05	Capture Transfer
65 102056639	M	????	WILD	WILD	INDIA AIZAWL	03-Jun-03 05-Jun-03	Capture Transfer
66 STM011 MUNU 0006B72F63	M	14-Dec-03	47	52	ASSAM HYDERABAD	14-Dec-03 30-Jul-16	Birth Ltf
67 102056567	F	20-Feb-04	57	54	AIZAWL	20-Feb-04	Birth
68	F	????	WILD	WILD	INDIA DELHI	~ 2004 ~ 2004 ~ Oct 2014	Capture Transfer Death
69 1020558211	M	15-Dec-04	58	56	AIZAWL	15-Dec-04	Birth
70 102057913	F	15-Dec-04	65	59	AIZAWL	15-Dec-04	Birth
71 102057915	M	07-Mar-05	58	54	AIZAWL	07-Mar-05	Birth
72	F	????	UNK	UNK	UNKNOWN TIRUPATI	???? 30-Nov-06 04-Jan-13	Birth Transfer Death
73 102057914	M	08-Apr-05	57	56	AIZAWL	08-Apr-05	Birth
74 102058293	F	23-May-05	58	56	AIZAWL	23-May-05	Birth
75 1020583	F	22-Jun-05	57	56	AIZAWL	22-Jun-05	Birth
76 STM013 DHOON 0006B733ED	F	03-Jul-05	47	52	ASSAM	03-Jul-05	Birth
77 102057916	M	15-Dec-05	57	59	AIZAWL	15-Dec-05	Birth
78 102057917	M	20-Feb-06	64	54	AIZAWL	20-Feb-06	Birth
79 KUM KUM 0006B733ED	F	07-Apr-06	47	61	ASSAM HYDERABAD	07-Apr-06 30-Jul-16	Birth Ltf

Stud# Local ID Name Transponder	Sex	Birth Date	Sire	Dam	Location	Date	Event
80 102057918	M	24-May-06	58	56	AIZAWL	24-May-06	Birth
81 102057919	M	02-Jun-06	57	56	AIZAWL	02-Jun-06	Birth
82 102057923	F	21-Apr-07	57	56	AIZAWL	21-Apr-07	Birth
83 102057922	F	04-Jun-07	58	54	AIZAWL	04-Jun-07	Birth
84 STM015 RUNJUN	F	16-Oct-11	66	61	ASSAM	16-Oct-11	Birth
85 102057921	F	05-Mar-12	57	59	AIZAWL	05-Mar-12	Birth
86 102057920	M	01-Jun-12	65	59	AIZAWL	01-Jun-12	Birth
87	M	????	WILD	WILD	INDIA SHILLONG	29-Oct-13 29-Oct-13 ~ Oct 2017	Capture Transfer Death
88	F	~ Jul 1998	WILD	WILD	INDIA MIAO	10-Nov-98 10-Nov-98	Capture Transfer
89	M	~ Aug 2000	WILD	WILD	INDIA MIAO	08-Oct-01 08-Oct-01	Capture Transfer
90 102057924	?	27-Aug-14	58	59	AIZAWL	27-Aug-14	Birth
91	M	????	UNK	UNK	UNKNOWN VISAKAPAT	???? ~ 1999 03-Jun-05	Birth Transfer Death
92	F	????	UNK	UNK	UNKNOWN VISAKAPAT	???? ~ 1999 07-May-01	Birth Transfer Death
93	F	????	UNK	UNK	UNKNOWN VISAKAPAT	???? ~ 1999	Birth Ltf
94	M	????	UNK	UNK	UNKNOWN VISAKAPAT	???? ~ 2002 10-Oct-13	Birth Transfer Death
95 HARI 0006B72103	M	30-Jun-99	UNK	UNK	TIRUPATI	30-Jun-99 ~ Oct 2016	Birth Death
96 SARADA	F	????	UNK	UNK	VISAKAPAT	????	Birth
97 STM016 RAGINI	F	31-Mar-14	66	61	ASSAM	31-Mar-14	Birth
98 STM017 RAJU	M	21-May-14	66	76	ASSAM	21-May-14	Birth
99 STM018 KUKI	F	25-Jun-15	66	79	ASSAM	25-Jun-15	Birth
100 PST01	M	02-Oct-96	UNK	UNK	PATNA BOKARO	02-Oct-96 31-Dec-98	Birth Transfer Ltf
101 STM001 HANUMAN	M	~ Aug 1991	WILD	WILD	INDIA ASSAM	???? 21-Feb-92 03-Aug-12	Capture Transfer Death

Stud# Local ID Name Transponder	Sex	Birth Date	Sire	Dam	Location	Date	Event
102 JAMUNA	F	~ 1991	WILD	WILD	INDIA ASSAM	???? 20-May-92 24-Sep-00	Capture Transfer Death
103 MADHAB	M	11-Sep-95	33	102	ASSAM	11-Sep-95 03-Aug-12	Birth Death
104 BHULA	M	~ 1997	WILD	WILD	INDIA ASSAM	???? 17-Oct-98 23-May-11	Capture Transfer Death
105 SACHIN	M	23-Jul-01	47	52	ASSAM	23-Jul-01 30-Nov-12	Birth Death
106	F	18-Mar-17	UNK	UNK	ASSAM	18-Mar-17	Birth
107 500192	M	12-Dec-03	UNK	UNK	ASSAM HYDERABAD	12-Dec-03 04-Sep-16 ~ Sep 2016	Birth Transfer Death
108 500193	F	04-Apr-06	UNK	UNK	ASSAM HYDERABAD	04-Apr-06 04-Sep-16	Birth Transfer
109 RAJKUMAR	M	~ 2008	WILD	WILD	INDIA KOHIMA	~16 Dec2008 16-Dec-2008	Capture Transfer
110	F	~24 Apr 2009	WILD	WILD	INDIA KOHIMA	~24 Apr2009 24-Apr-2009	Capture Transfer
111 SARAMATI	M	~ 2005	WILD	WILD	INDIA KOHIMA	~ 4 Jul2009 04-Jul-2009	Capture Transfer
112 RAMBO	M	~ 2006	WILD	WILD	INDIA KOHIMA	~ 8 May2013 08-May-2013	Capture Transfer
113 PENSY	F	~ 2015	WILD	WILD	INDIA KOHIMA	~24 Jul2017 24-Jul-2017	Capture Transfer
TOTALS: : 113 (60.52.1)							

Annexure II

Living population of Stump tailed macaque (*Macaca arctoides*) in Indian zoos

Stud# Local ID Name Transponder	Sex	Birth Date	Sire	Dam	Location	Date	Event
Aizawal Zoological Park, Aizawal							
54 102057520	F	????	WILD	WILD	INDIA AIZAWL	???? ????	Capture Transfer
56 102057655	F	????	WILD	WILD	INDIA AIZAWL	???? ????	Capture Transfer
57 10057736	M	????	WILD	WILD	INDIA AIZAWL	???? ????	Capture Transfer
58 981098100800311	M	????	WILD	WILD	INDIA AIZAWL	???? ????	Capture Transfer
59 102057656	F	????	WILD	WILD	INDIA AIZAWL	08-Aug-04 09-Aug-04	Capture Transfer
62 102037520	F	????	WILD	WILD	INDIA AIZAWL	20-May-04 21-May-04	Capture Transfer
64 102057737	M	????	WILD	WILD	INDIA AIZAWL	05-Sep-05 07-Sep-05	Capture Transfer
65 102056639	M	????	WILD	WILD	INDIA AIZAWL	03-Jun-03 05-Jun-03	Capture Transfer
67 102056567	F	20-Feb-04	57	54	AIZAWL	20-Feb-04	Birth
69 1020558211	M	15-Dec-04	58	56	AIZAWL	15-Dec-04	Birth
70 102057913	F	15-Dec-04	65	59	AIZAWL	15-Dec-04	Birth
71 102057915	M	07-Mar-05	58	54	AIZAWL	07-Mar-05	Birth
73 102057914	M	08-Apr-05	57	56	AIZAWL	08-Apr-05	Birth
74 102058293	F	23-May-05	58	56	AIZAWL	23-May-05	Birth
75 1020583	F	22-Jun-05	57	56	AIZAWL	22-Jun-05	Birth
77 102057916	M	15-Dec-05	57	59	AIZAWL	15-Dec-05	Birth
78 102057917	M	20-Feb-06	64	54	AIZAWL	20-Feb-06	Birth
80 102057918	M	24-May-06	58	56	AIZAWL	24-May-06	Birth
81 102057919	M	02-Jun-06	57	56	AIZAWL	02-Jun-06	Birth
82 102057923	F	21-Apr-07	57	56	AIZAWL	21-Apr-07	Birth
83 102057922	F	04-Jun-07	58	54	AIZAWL	04-Jun-07	Birth
85 102057921	F	05-Mar-12	57	59	AIZAWL	05-Mar-12	Birth
86 102057920	M	01-Jun-12	65	59	AIZAWL	01-Jun-12	Birth
90 102057924	?	27-Aug-14	58	59	AIZAWL	27-Aug-14	Birth
Total: 24 (12.11.1)							

Stud# Local ID Name Transponder	Sex	Birth Date	Sire	Dam	Location	Date	Event
Assam State Zoo cum Botanical Garden, Guwahati							
47 STM007 TARZAN 0006B76D36	M	05-Sep-96	WILD	WILD	ASSAM	07-Dec-96 07-Dec-96	Capture Transfer
61 KABITA 0006B7296F	F	????	WILD	WILD	INDIA SHILLONG ASSAM	22-Apr-03 22-Apr-03 28-Feb-05	Capture Transfer Transfer
76 STM013 DHOON 0006B733ED	F	03-Jul-05	47	52	ASSAM	03-Jul-05	Birth
84 STM015 RUNJUN	F	16-Oct-11	66	61	ASSAM	16-Oct-11	Birth
97 STM016 RAGINI	F	31-Mar-14	66	61	ASSAM	31-Mar-14	Birth
99 STM018 KUKI	F	25-Jun-15	66	79	ASSAM	25-Jun-15	Birth
106	F	18-Mar-17	UNK	UNK	ASSAM	18-Mar-17	Birth
Total: 8 (2.6.0)							
Jawaharlal Nehru Biological Park, Bokaro							
35 MIR	M	~ 1990	WILD	WILD	INDIA BOKARO	20-Jun-92 20-Jun-92	Capture Transfer
37 PST02 MIRA	F	15-Aug-90	WILD	WILD	INDIA BOKARO	15-Aug-90 15-Aug-90	Capture Transfer
Total: 2 (1.1.0)							
Nehru Zoological Park, Hyderabad							
108 500193	F	04-Apr-06	UNK	UNK	ASSAM HYDERABAD	04-Apr-06 04-Sep-16	Birth Transfer
Total: 1 (0.1.0)							
NawabWazid Ali Shah Zoological Garden, Lucknow							
40	F	~ 1992	WILD	WILD	INDIA LUCKNOW	03-Mar-98 03-Mar-98	Capture Transfer
Total: 1 (0.1.0)							
Mini Zoo, Miao							
88	F	~ Jul 1998	WILD	WILD	INDIA MIAO	10-Nov-98 10-Nov-98	Capture Transfer
89	M	~ Aug 2000	WILD	WILD	INDIA MIAO	08-Oct-01 08-Oct-01	Capture Transfer
Total: 2 (1.1.0)							
Lady Hydari Park Zoo, Shillong							
53 43	F	????	WILD	WILD	INDIA SHILLONG	12-May-98 12-May-98	Capture Transfer
Total: 1 (0.1.0)							
Sri Venkateswara Zoological Park, Tirupati							
95 HARI	M	30-Jun-99	UNK	UNK	TIRUPATI	30-Jun-99	Birth

Stud# Local ID Name Transponder	Sex	Birth Date	Sire	Dam	Location	Date	Event
0006B72103							
Total: 1 (1.0.0)							
Indira Gandhi Zoological Park, Visakapatnam							
96 SARADA	F	????	UNK	UNK	VISAKAPAT	????	Birth
Total: 1 (0.1.0)							
Nagaland Zoological Park, Dimapur							
109 RAJKUMAR	M	~ 2008	WILD	WILD	INDIA KOHIMA	~16 Dec2008 16-Dec-2008	Capture Transfer
110	F	~24 Apr 2009	WILD	WILD	INDIA KOHIMA	~24 Apr2009 24-Apr-2009	Capture Transfer
111 SARAMATI	M	~ 2005	WILD	WILD	INDIA KOHIMA	~ 4 Jul2009 04-Jul-2009	Capture Transfer
112 RAMBO	M	~ 2006	WILD	WILD	INDIA KOHIMA	~ 8 May2013 08-May-2013	Capture Transfer
113 PENSY	F	~ 2015	WILD	WILD	INDIA KOHIMA	~24 Jul2017 24-Jul-2017	Capture Transfer
Total: 5 (3.2.0)							
Total living: 45 (19.25.1)							

Annexure III

Pedigree Chart Report Stump Tailed Macaque Studbook

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 1
================================================================================
                WILD                                        WILD
                                \           /               Sex: Male
                                 \         /      Birth Date:    ????
                                  \       /    Last Location: KANPUR    (dead)
                                dam\     /sire    House Name:
                                    \   /             Tattoo:
                                     \/              Tag/Band:
                                     1

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 2
================================================================================
                WILD                                        WILD
                                \           /               Sex: Female
                                 \         /      Birth Date:    ????
                                  \       /    Last Location: KANPUR    (dead)
                                dam\     /sire    House Name:
                                    \   /             Tattoo:
                                     \/              Tag/Band:
                                     2

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 3
================================================================================
                WILD                                        WILD
                                \           /               Sex: Female
                                 \         /      Birth Date:    ????
                                  \       /    Last Location: INDIA     (dead)
                                dam\     /sire    House Name:
                                    \   /             Tattoo:
                                     \/              Tag/Band:
                                     3

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 4
================================================================================
                WILD                                        WILD
                                \           /               Sex: Male
                                 \         /      Birth Date:    ????
                                  \       /    Last Location: KANPUR    (dead)
                                dam\     /sire    House Name:
                                    \   /             Tattoo:
                                     \/              Tag/Band:
                                     4

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 5
================================================================================
                WILD                                        WILD
                                \           /               Sex: Male
                                 \         /      Birth Date:    ????
                                  \       /    Last Location: AHMEDABAD (dead)
                                dam\     /sire    House Name:
                                    \   /             Tattoo:
                                     \/              Tag/Band:
                                     5
```

```
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 6
 ================================================================================
        WILD                 WILDWILDWILD
              dam\    /sire                              dam\    /sire
                  \  /                                       \  /
                   \/                                         \/
                   2    +                                     1    +
                                    \          /              Sex: Male
                                     \        /       Birth Date:  ~ Aug 1978
                                      \      /     Last Location: KANPUR    (dead)
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                         \/            Tag/Band:
+ Wild-caught...                         6

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 7
 ================================================================================
        WILD                 WILDWILDWILD
              dam\    /sire                              dam\    /sire
                  \  /                                       \  /
                   \/                                         \/
                   2    +                                     4    +
                                    \          /              Sex: Female
                                     \        /       Birth Date: 16 Jul 1979
                                      \      /     Last Location: KANPUR    (dead)
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                         \/            Tag/Band:
+ Wild-caught...                         7

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 8
 ================================================================================
   WILD      WILDWILDWILDWILDWILDWILDWILD
    dam\    /sire       dam\    /sire       dam\    /sire       dam\    /sire
        \  /                \  /                \  /                \  /
         \/                  \/                  \/                  \/
         2   *+              4    +              2   *+              1    +
              dam\    /sire                           dam\    /sire
                  \  /                                       \  /
                   \/                                         \/
                   7                                          6
                                    \          /              Sex: Female
                                     \        /       Birth Date: 15 Apr 1981
                                      \      /     Last Location: KANPUR    (dead)
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                         \/            Tag/Band:
                                         8
+ Wild-caught...  * Appear more than once...

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 9
 ================================================================================
                  WILD                                       WILD
                                    \          /              Sex: Male
                                     \        /       Birth Date:    ????
                                      \      /     Last Location: UNKNOWN
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                         \/            Tag/Band:
                                         9
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 10
================================================================================
                WILD                                        WILD
                                \          /                Sex: Female
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: UNKNOWN
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     10

================================================================================
Taxon Name: MACACA ARCTOIDES                         Studbook Number: 11
================================================================================
                WILD                                        WILD
                                \          /                Sex: Female
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: CHATBIR Z (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     11

================================================================================
Taxon Name: MACACA ARCTOIDES                         Studbook Number: 12
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: CHATBIR Z (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     12

================================================================================
Taxon Name: MACACA ARCTOIDES                         Studbook Number: 13
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: CHATBIR Z (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     13

================================================================================
Taxon Name: MACACA ARCTOIDES                         Studbook Number: 14
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: CHATBIR Z (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     14
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 15
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: VISAKAPAT
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       15

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 16
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: TIRUPATI  (dead)
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       16

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 17
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: UNKNOWN
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       17

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 18
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: TIRUPATI
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       18

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 19
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: UNKNOWN
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       19
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 20
================================================================================
                WILD                                        WILD
                                \          /                Sex: Female
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: TIRUPATI  (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/              Tag/Band:
                                     20

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 21
================================================================================
                WILD                                        WILD
                                \          /                Sex: Female
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: TIRUPATI  (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/              Tag/Band:
                                     21

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 22
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: VISAKAPAT
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/              Tag/Band:
                                     22

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 23
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: VISAKAPAT
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/              Tag/Band:
                                     23

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 24
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: VADODARA
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/              Tag/Band:
                                     24
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 25
================================================================================
                WILD                                        WILD
                                \          /                Sex: Female
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: VADODARA
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     25

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 26
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: AHMEDABAD (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     26

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 27
================================================================================
                WILD                                        WILD
                                \          /                Sex: Female
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: AHMEDABAD (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     27

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 28
================================================================================
                UNK                                         UNK
                                \          /                Sex: Female
                                 \        /      Birth Date:  9 Jun 1986
                                  \      /    Last Location: HYDERABAD (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     28

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 29
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: CHATBIR Z
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     29
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 30
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /      Birth Date:    ????
                                    \      /    Last Location: CHATBIR Z  (dead)
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                       30

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 31
================================================================================
       WILD                WILD
             dam\    /sire
                 \  /
                  \/
                  11   +                                    UNK
                                  \          /              Sex: Male
                                   \        /      Birth Date:  2 Jul 1989
                                    \      /    Last Location: CHATBIR Z
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
+ Wild-caught...                       31

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 32
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /      Birth Date:      ~ 1989
                                    \      /    Last Location: LUCKNOW   (dead)
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                       32

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 33
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /      Birth Date:    ????
                                    \      /    Last Location: ASSAM     (dead)
                                  dam\    /sire    House Name: LACHIT
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                       33

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 34
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /      Birth Date:      ~ 1991
                                    \      /    Last Location: LUCKNOW
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                       34
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 35
================================================================================
                 WILD                                      WILD
                                    \          /           Sex: Male
                                     \        /      Birth Date:      ~ 1990
                                      \      /    Last Location: BOKARO
                                    dam\    /sire    House Name: MIR
                                        \  /             Tattoo:
                                        \/             Tag/Band:
                                        35

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 36
================================================================================
       WILD                WILD
             dam\    /sire
                 \  /
                  \/
                  11   +                                   UNK
                                    \          /           Sex: Male
                                     \        /      Birth Date: 11 May 1990
                                      \      /    Last Location: CHATBIR Z
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                        \/             Tag/Band:
+ Wild-caught...                        36

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 37
================================================================================
                 WILD                                      WILD
                                    \          /           Sex: Female
                                     \        /      Birth Date: 15 Aug 1990
                                      \      /    Last Location: BOKARO
                                    dam\    /sire    House Name: mira
                                        \  /             Tattoo:
                                        \/             Tag/Band:
                                        37

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 38
================================================================================
                 WILD                                      WILD
                                    \          /           Sex: Male
                                     \        /      Birth Date:      ~ 1990
                                      \      /    Last Location: LUCKNOW
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                        \/             Tag/Band:
                                        38

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 39
================================================================================
                 WILD                                      WILD
                                    \          /           Sex: Female
                                     \        /      Birth Date:    ????
                                      \      /    Last Location: ASSAM     (dead)
                                    dam\    /sire    House Name: SWAPNA
                                        \  /             Tattoo:
                                        \/             Tag/Band:
                                        39
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 40
================================================================================
                WILD                                        WILD
                                \          /                Sex: Female
                                 \        /      Birth Date:      ~ 1992
                                  \      /    Last Location: LUCKNOW
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     40

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 41
================================================================================
                WILD                                        WILD
                                \          /                Sex: Female
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: SHILLONG  (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     41

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 42
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: AURANGABA (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     42

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 43
================================================================================
                WILD                                        WILD
                                \          /                Sex: Male
                                 \        /      Birth Date:    ????
                                  \      /    Last Location: IMPHAL (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     43

================================================================================
Taxon Name: MACACA ARCTOIDES                          Studbook Number: 44
================================================================================
                UNK                                         UNK
                                \          /                Sex: Male
                                 \        /      Birth Date: 31 Oct 1994
                                  \      /    Last Location: ASSAM     (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     44
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 45
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: CALCUTTA  (dead)
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       45

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 46
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: IMPHAL (dead)
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       46

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 47
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:  5 Sep 1996
                                    \      /     Last Location: ASSAM
                                  dam\    /sire     House Name: TARZAN
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       47

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 48
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: PATNA     (dead)
                                  dam\    /sire     House Name: Basant
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       48

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 49
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: KANPUR    (dead)
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       49
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 50
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: PATNA     (dead)
                                  dam\    /sire     House Name: Mantoo
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       50

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 51
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: PATNA     (dead)
                                  dam\    /sire     House Name: RAJU
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       51

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 52
================================================================================
                UNK                                         UNK
                                  \          /              Sex: Female
                                   \        /       Birth Date: 25 May 1997
                                    \      /     Last Location: ASSAM     (dead)
                                  dam\    /sire     House Name: Junu
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       52

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 53
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: SHILLONG
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       53

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 54
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: AIZAWL
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       54
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 55
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: SHILLONG  (dead)
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       55

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 56
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: AIZAWL
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       56

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 57
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: AIZAWL
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       57

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 58
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: AIZAWL
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       58

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 59
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: AIZAWL
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                       59
```

```
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 60
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                          dam\    /sire
                  \  /                                   \  /
                   \/                                     \/
                   48   +                                 50   +
BasantMantoo
                                    \          /            Sex: Female
                                     \        /      Birth Date:  2 May 2001
                                      \      /    Last Location: PATNA     (dead)
                                    dam\    /sire    House Name: SONI
                                        \  /             Tattoo:
                                         \/            Tag/Band:
+ Wild-caught...                        60

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 61
 ================================================================================
                   WILD                                    WILD
                                    \          /            Sex: Female
                                     \        /      Birth Date:    ????
                                      \      /    Last Location: ASSAM
                                    dam\    /sire    House Name: KABITA
                                        \  /             Tattoo:
                                         \/            Tag/Band:
                                         61

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 62
 ================================================================================
                   WILD                                    WILD
                                    \          /            Sex: Female
                                     \        /      Birth Date:    ????
                                      \      /    Last Location: AIZAWL
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                         \/            Tag/Band:
                                         62

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 63
 ================================================================================
                   WILD                                    WILD
                                    \          /            Sex: Male
                                     \        /      Birth Date:    ????
                                      \      /    Last Location: DELHI
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                         \/            Tag/Band:
                                         63

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 64
 ================================================================================
                   WILD                                    WILD
                                    \          /            Sex: Male
                                     \        /      Birth Date:    ????
                                      \      /    Last Location: AIZAWL
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                         \/            Tag/Band:
                                         64
```

```
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 65
 ================================================================================
                 WILD                                        WILD
                                  \          /               Sex: Male
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: AIZAWL
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                      \/              Tag/Band:
                                      65

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 66
 ================================================================================
        UNK                 UNK                 WILD                 WILD
              dam\    /sire                             dam\    /sire
                  \  /                                      \  /
                   \/                                        \/
                   52                                        47   +
Junu                                  TARZAN
                                  \          /               Sex: Male
                                   \        /       Birth Date: 14 Dec 2003
                                    \      /     Last Location: HYDERABAD
                                  dam\    /sire     House Name: MUNU
                                      \  /              Tattoo:
                                      \/              Tag/Band:
+ Wild-caught...                      66

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 67
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                             dam\    /sire
                  \  /                                      \  /
                   \/                                        \/
                   54   +                                    57   +
                                  \          /               Sex: Female
                                   \        /       Birth Date: 20 Feb 2004
                                    \      /     Last Location: AIZAWL
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                      \/              Tag/Band:
+ Wild-caught...                      67

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 68
 ================================================================================
                 WILD                                        WILD
                                  \          /               Sex: Female
                                   \        /       Birth Date:    ????
                                    \      /     Last Location: DELHI
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                      \/              Tag/Band:
                                      68
```

```
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 69
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                          dam\    /sire
                  \  /                                   \  /
                   \/                                     \/
                   56   +                                 58   +
                                \           /             Sex: Male
                                 \         /      Birth Date: 15 Dec 2004
                                  \       /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     69

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 70
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                          dam\    /sire
                  \  /                                   \  /
                   \/                                     \/
                   59   +                                 65   +
                                \           /             Sex: Female
                                 \         /      Birth Date: 15 Dec 2004
                                  \       /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     70

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 71
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                          dam\    /sire
                  \  /                                   \  /
                   \/                                     \/
                   54   +                                 58   +
                                \           /             Sex: Male
                                 \         /      Birth Date:  7 Mar 2005
                                  \       /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     71

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 72
 ================================================================================
                  UNK                                    UNK
                                \           /             Sex: Female
                                 \         /      Birth Date:    ????
                                  \       /    Last Location: TIRUPATI  (dead)
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                     72
```

```
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 73
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   56   +                                  57   +
                                \          /               Sex: Male
                                 \        /      Birth Date:  8 Apr 2005
                                  \      /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     73

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 74
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   56   +                                  58   +
                                \          /               Sex: Female
                                 \        /      Birth Date: 23 May 2005
                                  \      /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     74

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 75
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   56   +                                  57   +
                                \          /               Sex: Female
                                 \        /      Birth Date: 22 Jun 2005
                                  \      /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     75

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 76
 ================================================================================
        UNK                 UNK                 WILD                WILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   52                                      47   +
Junu                                TARZAN
                                \          /               Sex: Female
                                 \        /      Birth Date:  3 Jul 2005
                                  \      /    Last Location: ASSAM
                                dam\    /sire    House Name: DHOON DHOON
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     76
```

```
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 77
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   59   +                                  57   +
                                \          /               Sex: Male
                                 \        /      Birth Date: 15 Dec 2005
                                  \      /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     77

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 78
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   54   +                                  64   +
                                \          /               Sex: Male
                                 \        /      Birth Date: 20 Feb 2006
                                  \      /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     78

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 79
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   61   +                                  47   +
                  KABITA                                  TARZAN
                                \          /               Sex: Female
                                 \        /      Birth Date:  7 Apr 2006
                                  \      /    Last Location: HYDERABAD
                                dam\    /sire    House Name: KUM KUM
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     79

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 80
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   56   +                                  58   +
                                \          /               Sex: Male
                                 \        /      Birth Date: 24 May 2006
                                  \      /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                     80
```

```
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 81
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                             dam\    /sire
                  \  /                                      \  /
                   \/                                        \/
                   56   +                                    57   +
                                \          /                Sex: Male
                                 \        /      Birth Date:  2 Jun 2006
                                  \      /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                    81

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 82
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                             dam\    /sire
                  \  /                                      \  /
                   \/                                        \/
                   56   +                                    57   +
                                \          /                Sex: Female
                                 \        /      Birth Date: 21 Apr 2007
                                  \      /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                    82
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 83
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                             dam\    /sire
                  \  /                                      \  /
                   \/                                        \/
                   54   +                                    58   +
                                \          /                Sex: Female
                                 \        /      Birth Date:  4 Jun 2007
                                  \      /    Last Location: AIZAWL
                                dam\    /sire    House Name:
                                    \  /             Tattoo:
                                     \/            Tag/Band:
+ Wild-caught...                    83
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                          Studbook Number: 84
 ================================================================================
                                          UNK       UNK       WILD      WILD
                                           dam\    /sire       dam\    /sire
                                               \  /                \  /
                                                \/                  \/
        WILD                WILD                 52                  47   +
Junu                TARZAN
              dam\    /sire                             dam\    /sire
                  \  /                                      \  /
                   \/                                        \/
                   61   +                                    66
                  KABITA                                     MUNU
                                \          /                Sex: Female
                                 \        /      Birth Date: 16 Oct 2011
                                  \      /    Last Location: ASSAM
                                dam\    /sire    House Name: RUNJUN
                                    \  /             Tattoo:
                                     \/            Tag/Band:
  + Wild-caught...                  84
```

```
 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 85
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   59   +                                  57   +
                                    \          /            Sex: Female
                                     \        /      Birth Date:  5 Mar 2012
                                      \      /    Last Location: AIZAWL
                                    dam\    /sire    House Name:
                                        \  /            Tattoo:
                                         \/           Tag/Band:
+ Wild-caught...                         85

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 86
 ================================================================================
        WILD                WILDWILDWILD
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                   59   +                                  65   +
                                    \          /            Sex: Male
                                     \        /      Birth Date:  1 Jun 2012
                                      \      /    Last Location: AIZAWL
                                    dam\    /sire    House Name:
                                        \  /            Tattoo:
                                         \/           Tag/Band:
+ Wild-caught...                         86

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 87
 ================================================================================
                WILD                                    WILD
                                    \          /            Sex: Unknown
                                     \        /      Birth Date:    ????
                                      \      /    Last Location: SHILLONG
                                    dam\    /sire    House Name:
                                        \  /            Tattoo:
                                         \/           Tag/Band:
                                         87

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 88
 ================================================================================
                WILD                                    WILD
                                    \          /            Sex: Female
                                     \        /      Birth Date:  ~ Jul 1998
                                      \      /    Last Location: MIAO
                                    dam\    /sire    House Name:
                                        \  /            Tattoo:
                                         \/           Tag/Band:
                                         88

 ================================================================================
 Taxon Name: MACACA ARCTOIDES                        Studbook Number: 89
 ================================================================================
                WILD                                    WILD
                                    \          /            Sex: Male
                                     \        /      Birth Date:  ~ Aug 2000
                                      \      /    Last Location: MIAO
                                    dam\    /sire    House Name:
                                        \  /            Tattoo:
                                         \/           Tag/Band:
                                         89
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 90
================================================================================
       WILD               WILDWILDWILD
             dam\    /sire                          dam\    /sire
                 \  /                                   \  /
                  \/                                     \/
                  59   +                                 58   +
                                  \          /           Sex: Unknown
                                   \        /      Birth Date: 27 Aug 2014
                                    \      /    Last Location: AIZAWL
                                  dam\    /sire    House Name:
                                      \  /           Tattoo:
                                       \/            Tag/Band:
+ Wild-caught...                       90

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 91
================================================================================
                  UNK                                    UNK
                                  \          /           Sex: Male
                                   \        /      Birth Date:    ????
                                    \      /    Last Location: VISAKAPAT (dead)
                                  dam\    /sire    House Name:
                                      \  /           Tattoo:
                                       \/            Tag/Band:
                                       91

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 92
================================================================================
                  UNK                                    UNK
                                  \          /           Sex: Female
                                   \        /      Birth Date:    ????
                                    \      /    Last Location: VISAKAPAT (dead)
                                  dam\    /sire    House Name:
                                      \  /           Tattoo:
                                       \/            Tag/Band:
                                       92

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 93
================================================================================
                  UNK                                    UNK
                                  \          /           Sex: Female
                                   \        /      Birth Date:    ????
                                    \      /    Last Location: VISAKAPAT
                                  dam\    /sire    House Name:
                                      \  /           Tattoo:
                                       \/            Tag/Band:
                                       93

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 94
================================================================================
                  UNK                                    UNK
                                  \          /           Sex: Male
                                   \        /      Birth Date:    ????
                                    \      /    Last Location: VISAKAPAT (dead)
                                  dam\    /sire    House Name:
                                      \  /           Tattoo:
                                       \/            Tag/Band:
                                       94
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 95
================================================================================
                 UNK                                      UNK
                                \          /              Sex: Male
                                 \        /       Birth Date: 30 Jun 1999
                                  \      /     Last Location: TIRUPATI
                                dam\    /sire     House Name: hari
                                    \  /              Tattoo:
                                    \/              Tag/Band:
                                    95

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 96
================================================================================
                 UNK                                      UNK
                                \          /              Sex: Female
                                 \        /       Birth Date:    ????
                                  \      /     Last Location: VISAKAPAT
                                dam\    /sire     House Name: sarada
                                    \  /              Tattoo:
                                    \/              Tag/Band:
                                    96

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 97
================================================================================
                                          UNK       UNK       WILD      WILD
                                           dam\    /sire       dam\    /sire
                                               \  /                \  /
                                               \/                  \/
        WILD                WILD               52                  47   +
Junu               TARZAN
              dam\    /sire                          dam\    /sire
                  \  /                                   \  /
                  \/                                     \/
                  61   +                                 66
                 KABITA                                  MUNU
                                \          /              Sex: Female
                                 \        /       Birth Date: 31 Mar 2014
                                  \      /     Last Location: ASSAM
                                dam\    /sire     House Name: RAGINI
                                    \  /              Tattoo:
                                    \/              Tag/Band:
+ Wild-caught...                    97

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 98
================================================================================
   UNK       UNK       WILD      WILD      UNK       UNK       WILD      WILD
    dam\    /sire       dam\    /sire       dam\    /sire       dam\    /sire
        \  /                \  /                \  /                \  /
        \/                  \/                  \/                  \/
        52  *               47  *+              52  *               47  *+
Junu               TARZAN               Junu               TARZAN
              dam\    /sire                          dam\    /sire
                  \  /                                   \  /
                  \/                                     \/
                  76                                     66
                DHOON DH                                MUNU
                                \          /              Sex: Male
                                 \        /       Birth Date: 21 May 2014
                                  \      /     Last Location: HYDERABAD
                                dam\    /sire     House Name: RAJU
                                    \  /              Tattoo:
                                    \/              Tag/Band:
                                    98
+ Wild-caught...  * Appear more than once...
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 99
================================================================================
  WILD      WILDWILDWILD      UNK       UNK       WILD      WILD
   dam\    /sire       dam\    /sire       dam\    /sire       dam\    /sire
       \  /                \  /                \  /                \  /
        \/                  \/                  \/                  \/
        61   +              47  *+              52                  47  *+
       KABITA              TARZAN              Junu                TARZAN
             dam\    /sire                           dam\    /sire
                 \  /                                    \  /
                  \/                                      \/
                  79                                      66
                KUM KUM                                   MUNU
                                  \          /            Sex: Female
                                   \        /      Birth Date: 25 Jun 2015
                                    \      /    Last Location: ASSAM
                                   dam\    /sire    House Name: KUKI
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                        99
+ Wild-caught...  * Appear more than once...

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 100
================================================================================
                  UNK                                     UNK
                                  \          /            Sex: Male
                                   \        /      Birth Date:  2 Oct 1996
                                    \      /    Last Location: BOKARO
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                       100

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 101
================================================================================
                  WILD                                    WILD
                                  \          /            Sex: Male
                                   \        /      Birth Date:  ~ Aug 1991
                                    \      /    Last Location: ASSAM     (dead)
                                   dam\    /sire    House Name: HANUMAN
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                       101

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 101
================================================================================
                  WILD                                    WILD
                                  \          /            Sex: Male
                                   \        /      Birth Date:      ~ 1991
                                    \      /    Last Location: ASSAM     (dead)
                                   dam\    /sire    House Name: HANUMAN
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                       101
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 102
================================================================================
                 WILD                                       WILD
                                    \          /            Sex: Female
                                     \        /      Birth Date:      ~ 1991
                                      \      /    Last Location: ASSAM     (dead)
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                         \/            Tag/Band:
                                        102

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 103
================================================================================
       WILD               WILDWILDWILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
                 102   +                                     33   +
                                                            LACHIT
                                    \          /            Sex: Male
                                     \        /      Birth Date: 11 Sep 1995
                                      \      /    Last Location: ASSAM     (dead)
                                    dam\    /sire    House Name: MADHAB
                                        \  /             Tattoo:
                                         \/            Tag/Band:
+ Wild-caught...                        103

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 104
================================================================================
                 WILD                                       WILD
                                    \          /            Sex: Male
                                     \        /      Birth Date:      ~ 1997
                                      \      /    Last Location: ASSAM     (dead)
                                    dam\    /sire    House Name: BHULA
                                        \  /             Tattoo:
                                         \/            Tag/Band:
                                        104

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 105
================================================================================
       UNK                UNK                WILD                WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
                  52                                         47   +
Junu                                  TARZAN
                                    \          /            Sex: Male
                                     \        /      Birth Date: 23 Jul 2001
                                      \      /    Last Location: ASSAM     (dead)
                                    dam\    /sire    House Name: SACHIN
                                        \  /             Tattoo:
                                         \/            Tag/Band:
+ Wild-caught...                        105

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 106
================================================================================
                 UNK                                        UNK
                                    \          /            Sex: Female
                                     \        /      Birth Date: 18 Mar 2017
                                      \      /    Last Location: ASSAM
                                    dam\    /sire    House Name:
                                        \  /             Tattoo:
                                         \/            Tag/Band:
                                        106
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 107
================================================================================
                UNK                                     UNK
                              \           /
                               \         /               Sex: Male
                                \       /      Birth Date: 12 Dec 2003
                                 \     /    Last Location: HYDERABAD (dead)
                               dam\   /sire    House Name:
                                   \ /             Tattoo:
                                    \/           Tag/Band:
                                   107

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 108
================================================================================
                UNK                                     UNK
                             \           /              Sex: Female
                              \         /      Birth Date:  4 Apr 2006
                               \       /    Last Location: HYDERABAD
                             dam\    /sire    House Name:
                                 \  /             Tattoo:
                                  \/            Tag/Band:
                                 108


================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 109
================================================================================
                WILD                                    WILD
                             \           /              Sex: Male
                              \         /      Birth Date:      ~ 2008
                               \       /    Last Location: KOHIMA
                             dam\    /sire    House Name: RAJKUMAR
                                 \  /             Tattoo:
                                  \/            Tag/Band:
                                 109

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 110
================================================================================
                WILD                                    WILD
                             \           /              Sex: Female
                              \         /      Birth Date:~24 Apr 2009
                               \       /    Last Location: KOHIMA
                             dam\    /sire    House Name:
                                 \  /             Tattoo:
                                  \/            Tag/Band:
                                 110

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 111
================================================================================
                WILD                                    WILD
                             \           /              Sex: Male
                              \         /      Birth Date:      ~ 2005
                               \       /    Last Location: KOHIMA
                             dam\    /sire    House Name: SARAMATI
                                 \  /             Tattoo:
                                  \/            Tag/Band:
                                 111
```

```
================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 112
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Male
                                   \        /       Birth Date:      ~ 2006
                                    \      /     Last Location: KOHIMA
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                      112

================================================================================
Taxon Name: MACACA ARCTOIDES                        Studbook Number: 113
================================================================================
                WILD                                        WILD
                                  \          /              Sex: Female
                                   \        /       Birth Date:      ~ 2015
                                    \      /     Last Location: KOHIMA
                                  dam\    /sire     House Name:
                                      \  /              Tattoo:
                                       \/             Tag/Band:
                                      113
```

Annexure IV

Location Glossary

Mnemonic	Location
AHMEDABAD	Kamla Nehru Zoological Garden, Ahmedabad
AIZAWL	Aizawal Zoological Park, Aizawal
ASSAM	Assam State Zoo cum Botanical Garden, Guwahati
AURANGABA	Aurangabad Zoo, Aurangabad
BOKARO	Jawaharlal Nehru Biological Park,Bokaro
CALCUTTA	Alipore Zoological Garden, Kolkatta
CHATBIR Z	M.C. Zoological Park, Chat-bir, Mohali
DELHI	National Zoological Park, New Delhi
HYDERABAD	Nehru Zoological Park, Hyderabad
INDIA	All wild origin animals
KANPUR	Kanpur Zoological Park, Kanpur
LUCKNOW	NawabWazid Ali Shah Zoological Garden, Lucknow
IMPHAL	Manipur Zoological Garden, Imphal
MIAO	Mini Zoo, Miao
PATNA	Sanjay Gandhi Biological Park, Patna
SHILLONG	Lady Hydari Park Zoo,Shillong
TIRUPATI	Sri VenkateswaraZoological Park,Tirupati
UNKNOWN	Unknown Location
VADODARA	Sri SayajiBaug Zoo, Vadodara
VISAKAPAT	Indira Gandhi Zoological Park,Visakapatnam