NATIONAL STUDBOOK

NILGIRI LANGUR *(Trachypithecus johnii)* II Edition

Published as a part of the Central Zoo Authority sponsored project titled
"Development and Maintenance of Studbooks for Selected Endangered Species in Indian Zoos"

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Central Zoo Authority

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Guindy Children's Park, Guindy
Kamla Nehru Zoological Garden, Ahmedabad
Kanpur Zoological Park, Kanpur
Nandankanan Biological Park, Bhubaneswar
Nehru Zoological Park, Hyderabad
Sakkarbaug Zoo, Junagadh
Sri Chamarajendra Zoological Garden, Mysore
Thiruvanthapuram Zoo, Thiruvanthapuram

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Authors

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Species Biology

Nilgiri langurs belong to a large group of leaf eating primates (Sub-family *Colobinae*) inhabiting south-Asia. Colobines are uniquely adapted to folivory being capable to ferment the leaves in their fore-gut. The species is endemic to Western-Ghats in south-west India.

Taxonomy

Phylum	Chordata
Sub-phylum	Vertebrata
Class	Mammalia
Order	Primates
Family	Cercopithecidae
Sub-family	Colobinae
Genus	*Trachypithecus*
Species	*Trachypithecus johnii* (J. Fischer, 1829)

The systematic classification of the species has been debated for long and the generic level classification has undergone several revisions. It was initially described by Fischer (1829) and placed in the genus *Cercopithecus* based on morphological features. Subsequently Blanford (1888 – 91) reassigned the genus to *Semnopithecus* based on similarities with Hanuman langurs. Hill (1939) placed leaf monkeys in four genera namely *Presbytis*, (*melalophos* and its relatives); *Semnopithecus* (the single species *entellus*); *Trachypithecus* (*phayrei*, *francoisi* and their relatives); and *Kasi*, (*johnii* and *vetulus*). The genus *Kasi* was renamed as *Trachypithecus* by Eudey (1987) and Nowak (1991).

Based on morphological similarities such as; cranial morphology, neonate pelage colour, and sexually dichromatic pubic integument; between Nilgiri, purple-faced langurs and genus *Trachypithecus*, along with rest of the south-east Asian leaf monkeys (Groves 2001) recognized *Semnopithecus* as a monotypic genus, containing *Semnopithecus entellus* while placing the remaining species in the genus *Trachypithecus* along with other leaf monkeys of Southeast Asia.

Two models have been suggested to resolve the phylogenetic position of langurs in the Indian subcontinent. They are the disjunct distribution or the refugial model and the convergence model. The disjunct distribution model suggests that since most of the Southeast Asian leaf monkeys and the Nilgiri and purple-faced langurs occupy wet forest habitat, while Hanuman langurs alone occupy drier habitats; support of their placement into two different genera. For this to occur, two independent migrations/ disjunct distribution of colobines into the Indian subcontinent should have taken place, one of the wet forest species (southeast Asian leaf monkeys and Nilgiri and purple-faced langurs) and the other of the dry zone species (Hanuman langurs) (Karanth *et al.* 2008). On the other hand, relatedness of the two of the wet-forest species (Nilgiri and purple-faced langurs) to *Semnopithecus* would suggest convergence of morphological characters in Nilgiri and purple-faced langurs with *Trachypiithecus i.e.* independent evolution of the morphological characters similar to *Trachypithecus* in these two species.

Based on molecular data, Zhang and Ryder (1998) supported the common origin of Hanuman langur, Nilgiri langur, and purple-faced langur, excluding the leaf monkeys. Further to this, Brandon-Jones *et al.*

(2004) placed Nilgiri and purple-faced langurs in the genus *Semnopithecus* along with Hanuman langur suggesting close relationship among the langurs of the Indian subcontinent excluding the Southeast Asian leaf monkeys. Molecular phylogenetic studies on langurs by Karanth *et al.* (2008) and Karanth (2010) also suggest a close relationship among the langurs of Indian subcontinent (Hanuman, Nilgiri, and purple-faced langurs) leading to their being classified in the genus *Semnopithecus.* These studies suggest the placement of the members of the Indian clade in the genus *Semnopithecus* (confined to the Indian subcontinent) whereas those in Southeast Asian clade in the genus *Trachypithecus*.

The species is however, listed as *Trachypithecus johnii* by 'The Global Biodiversity Information Facility' and the same name has also been used by Singh *et al.* (2008), for its inclusion in 'The IUCN Red List of Threatened Species. Version 2014.3'. The current edition of the studbook accordingly has used the same name for naming the species.

Morphology

Hair of the crown and sides of the head is long and light brown with a tint of yellow in colour. Body is covered by long glossy fur, black to dark brown in colour. A cream patch on the inside of each thigh distinguishes females (Blanford 1988 – 91). The young are red-brown in colour that darkens and has a full adult colouration by 4-5 months (Poirier 1968a).

Table 1: Morphometrics of Nilgiri langur*

Characteristics	Range	
	Male	Female
Body length	78 cm	58.5 cm
Tail length	68.5 – 96.5 cm	
Body weight	9.1 – 13.2 kg	10.9 – 11.3 kg

* Source: Grizmek's Encyclopaedia of Mammals Vol. II (1990)

Habitat and ecology

The species inhabits a variety of forest types from 300 to 2,000 m in elevation (Molur *et al.* 2003) that include tropical moist deciduous, riverine, wet evergreen, and montane wet temperate forests (Oates *et al.* 1980; Poirier 1970) and riparian forests at lower elevations (Roonwal and Mohnot 1977; Kurup 1979; Singh *et al*. 1997). They are also found inhabiting montane shola forest patches at 2150m altitude (Ramachandran 1998).

Nilgiri langurs are primarily folivorous, diurnal, arboreal mammals and use different canopy levels for performing various activities. The middle canopy (11 to 20m) is the preferred stratum with majority of the time spent (57.70%) in this height, followed by the understory at 1-10m (19.87%). The species spends only 4.97% of their time in the top canopy of more than 30m height. They descend to the ground only for crossing grassland patches or roads and for geophagy (Ramachandran 1998).

The species is sympatric with Lion-tailed macaques across most of its range; however distinct niche segregation is present as they are primarily folivorous in contrast to the Lion tailed macaques that are

frugivorous (Roy *et al.* 2012). Further segregation is maintained by vertical stratification between them with Nilgiri langurs utilizing the lower substratum than the lion-tailed macaques during feeding and other activities (Ramachandran 1998, Singh *et al.* 2000).

Feeding ecology

Nilgiri langur similar to other Colobines, is a folivorous primate and exhibit a number of anatomical and behavioural adaptations to mechanically break down and digest coarse plant material (Garber 1987). They are polygastric, with a fore-stomach having high pH (5.0-7.0), specialized for bacterial fermentation (Bauchop and Martucci 1968). Their feeding ecology indicates the presence of young and mature leaves, flowers and fruits in the diet (Horwich 1972, Roonwal and Mohnot 1977, Ramachandran 1995, Srivastava, *et al.* 1996), with foliar components dominating. Other items present include fruits, seeds, flowers, bark, petioles, small twigs, mushrooms etc. (Roy *et al*. 2012).

They feed on a variety of food plants and adapt to new diets easily with changes in their home ranges (Poirier 1968b, 1969a). The number of food species varies greatly with forest type, duration of study period and method of data collection and have been reported as; 39 food plants (period of study three months) in Peryiar, (Horwich 1972); 54 food species in Servalar gallery forests in Mundanthurai wildlife sanctuary (Sunderraj and Johnsingh 1993) 29 food species in Periyar (in 30 days study) (Srivastava *et al.* 1996); 115 plant species (nine months study period) (Oates *et al.* 1980).

Comparing the 15 top food species in these studies, Sunderraj (2001) showed that 13 species were common between the years and nine species between groups. Therefore these nine species; *Derris pinnata, Terminalia bellerica, Syzygium cumini, Tamarindus indica, Albizia lebbeck, Albizia amara, Dalbergia paniculata, Acacia pennata* and *Commiphora caudate* have been considered as key species for the survival of Nilgiri langurs in the riverine forests at low elevations. *Derris pinnata* and *Terminalia bellerica* were the top two staple food resources constituting 22.18% of the total feeding records.

Of the 219 food items utilized from 102 plant species, the major diet of the Nilgiri langurs consisted of young leaves (44.06%), mature leaves (4.21%), flowers (8.44%), young fruit (10.51%), ripe fruit (4.59%), seeds (18.61%) and other minor food items (like petioles, bark, pith, termites, soil gum, dead wood) (9.57%) (Oates *et al.* 1980, Sunderraj 2001, Roy *et al*. 2012). Young foliage rich in proteins and low in fibre is preferred over mature leaves when present on the same plant (Dougall and Drysdale 1964; Poirier 1970, Horwich 1972; Struhsaker 1975; Hladik 1977; Oates *et al.* 1980; Baranga 1982; Sunderraj 2001) and also when mature foliage formed the most abundantly available potential food resource throughout the year (Oates *et al*. 1980). A highly selective dietary pattern is followed while feeding on mature foliage with the lamina being frequently discarded and only ingesting the petioles (Oates *et al.* 1980); ascribed to their lower non-structural carbohydrate content and higher available nutrients than leaf blades (Garber 1987).

Behaviour and social organization

The general daily activity of each Nilgiri langur troop includes frequent feeding bouts alternating with resting bouts during the day, interspersed with movement between feeding patches to change feeding locations (Horwich 1980). The troops can have four – eight such feeding/resting bouts during the day. A

bimodal trend in the feeding bouts has been observed, one between 6:00-9:00 hours and the other between 16:00-19:00 hours, spending around 48.96% and 55.77% of their time respectively (Horwich 1980, Sunderraj 2001). This activity pattern has been explained by the fact that the langurs needed to compensate for the long hours of non-feeding during the night to gain the necessary energy levels. The Nilgiri langur troops studied by Horwich (1980) showed a trimodal activity pattern, at 7:00 hours, noon and between 15:00-19:00 hours. Nilgiri langurs also undertake long and active trips late during the day when heading towards resting sites (Horwich 1972). Grooming activity takes place mainly between 8:00-12:00 hours and again in the afternoon between 13:00-16:00 hours; when feeding activity is at a low level. Play behaviour shows similar bimodal peaks once in the morning and again in the evening.

Social behaviour and structure

Nilgiri langur troops are structured into uni-male, multi-male, all-male and all-female groups (Sunderraj 2001, Roonwal and Mohnot 1977); however, multi-male and all-female groups are uncommon. Troops with only one adult male are characteristic of the Nilgiri langur social organization on the Mundanthurai plateau (KMTR) as well as at higher elevations (Poirier 1970, Hohmann and Sunderraj 1990).

The troop structure is highly fluid depending on the behavioural traits of individuals (Poirier 1969b); strong affiliative bonds exist between related females with distinct linear dominance hierarchies (Poirier 1970). Subordinate males challenge dominant ones; however, agonistic interactions between females are rare and they may emigrate without aggression from other troop members (Poirier 1970).

The troop size of the species varies for different locations and has been reported as; 5.68 in Shendurney Wildlife Sanctuary (Ramachandran 1995), 5.89 in the Silent Valley National Park (Joseph and Ramachandran 2003). Daniel and Kannan (1967) described the troop size to range from 1 – 30 individuals. Poirier (1970) estimated an average troop size of 17 individuals in the Ootacumnd area, Nilgiri Hills; while, Sunderraj (2001) reported a mean group size of 18.5 individuals in the Mundanthurai Plateau. This variation in troop size in different habitats is apparently caused by the differences in habitat quality and population density (Ramachandran 1998). Poirier (1968b) suggested that troops inhabiting high population density areas have smaller home ranges and in turn smaller troop size when compared to other areas. Bigger troops with larger home range have a greater probability of range overlap that might lead to increased agonistic interactions between the troops (Hohmann and Sunderraj 1990).

The age–sex composition has been reported to be female-biased in all the demographic studies (Poirier 1969b, Hohmann and Sunderraj 1990, Ramachandran 1998, Ramachandran and Joseph 2001) while the ratio of adult individuals (adults and sub-adults) to immature (infants and juveniles) ones show considerable bias towards the adults (100 adults:34 immature) at higher elevations (Poirier 1970) compared to that reported from the low elevations/foothills of the Mundanthurai plateau (100:57) (Sunderraj 2001).

Mother-infant relationship differs from other langurs with a feeble bond between the mother and infant and early weaning affecting the socialization process. The mother exhibits relative disinterestedness towards her infant and limited inter-animal interactions such as grooming and play while a juvenile

maintains a close relationship with its mother if allowed. They have a very short maternal investment, often supplemented by inconsistent allo-maternal care (Poirier 1968a). Poirier (1968a) noted that mothers may leave infants in the vicinity of other females to forage. Jay (1963) reported that non-lactating females often allow a newborn infant to suckle as a means of reducing stress to the infant. Poirier (1968a) observed that females engaged in babysitting showed no preference for nursing their own versus other females' infants and allo-mothering was also independent of relatedness or rank.

Territoriality

Nilgiri langurs have been reported to be extremely territorial of their home ranges with adult males ascending tree tops to scan for intruders. Territorial defence involves exchange of visual and/or vocal signals by adult males with frequent encounters between inter-troop males, but physical contact and injury are rare. Inter-troop separation is maintained through variable movement patterns, male whoop display and male vigilance behaviour (Poirier 1968c).

Aggressive inter-specific interactions with sympatric species have been observed during feeding with significantly seasonal influence (Sushma and Singh 2006). Nilgiri langurs and Lion tailed macaques show mutual intolerance during post-monsoon period when important food resources (flowers and fruits of *C. exarillata* and fruits of *F. Microcarpa*) are abundant. The interaction matrices of species pairs as studied by Sushma and Singh (2006), indicated inter-specific dominance hierarchy, with Bonnet macaque dominating all other species, followed by Lion-tailed macaque, Nilgiri langur and Giant squirrel respectively, and no evidence of hierarchy or intolerance between Nilgiri langurs and Giant squirrels.

Grooming

Roonwal and Mohnot (1977) stated that grooming in Nilgiri langurs is less frequent than Hanuman langurs and macaques and described it as being performed using both or one hand, palm and back of the hand; difficult to reach areas are groomed using the hind limbs. Due to their short thumb, Nilgiri langurs pick material from hair, which is then carried out using ones mouth. Except for occasional grooming bouts the groomer rarely uses its tongue or teeth in grooming. Social grooming in Nilgiri langurs serves to reduce tension between the individuals after agonistic encounters which accounts for approximately 45% of the grooming bouts. Self-grooming is limited to legs and thighs, where visual inspection can accompany manipulation and occurs in short bouts of less than five minutes.

Play

Play behaviour is exhibited mostly by infants and sub-adults with adults participating only in small troops that lack other members of these age classes. Play behaviour directed at mothers is unidirectional with mothers being passive participants. Play behaviour is initiated at the age of 3 months and up to four years of age for females and five – six years of age for males during the morning and afternoon resting and feeding periods (Poirier 1970).

Reproductive behaviour

Limited information on the reproductive behaviour of the species exists; however, it is assumed to be similar to that of its closest relative; the Hanuman langur. Birth seasonality shows 2 distinct peaks in

May and in November in the foothills of the Mundanthurai plateau, (Sunderraj 2001) and rain forests (Poirier 1970); coinciding with the availability of fresh leaf sprouts and growth following the southwest and northeast monsoons.

Table 2: Life history traits of Nilgiri langurs

Average age at sexual maturity	3-5 years
Gestation period	140 to 220 days
Birth seasonality	May and November (Poirier 1970, Sunderraj 2001)
Weaning age	10-11 months (Poirier 1970)

Vocal communication

The Nilgiri langurs produce 19 distinct vocalizations, (Poirier 1970). The different kinds of vocalizations as reported by Hohmann (1989) are: loud calls, cough bark, grunt bark, ho-ho calls, pant bark, soft bark, honk, rumble, snarl, cough, hiccup, alarm call, tonal contact calls, isolation peep, warble, whistle, contact tremolo, squeals, shrieks and wailing. The whoop display by dominant males include a series of 1- 7 whoops integrated with rapid movements along branches that lasts for 1-3 minutes (Horwich 1976) and serves to assert the dominance status in the troop (Horwich 1980).

Distribution

The species is endemic to the Western Ghats of India from the Aramboli Pass (at 8°16'N near the southern tip of India) north to Srimangala (12°01'N, 75°58'E) (Groves 2001) across the states of Karnataka, Kerala and Tamil Nadu. The distribution is disjunct and is spread across three landscapes (Ram 2007) with separated populations. The three landscapes supporting the species are as follows.

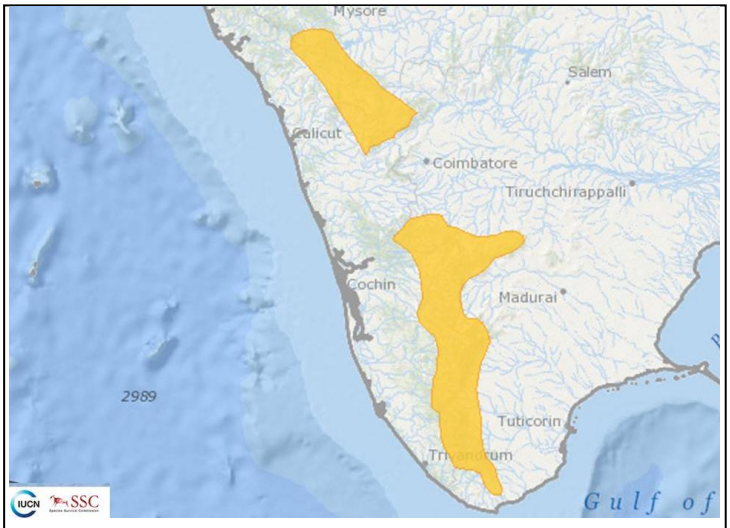


Figure 1: Distribution Nilgiri langur (Singh *et al.* 2008)

Landscape I: Brahmagiri hills in the north to the Silent Valley National Park in the south.

Landscape II: Anaimalai hills, Nelliampathy including Chimmony, Nemmara, Vazachal and Parmbikulam Wildlife Sanctuaries and Palani Hills.

Lanscape III: Periyar Tiger Reserve, Theni Division, Srivilliputtur Wildlife Sanctuary and southwards till the tip of the Western Ghats.

Threats and Conservation Measures

The species is hunted for its skin (used for making drums), bush-meat and traditional medicines (Roonwal and Mohnot 1977). It is also threatened by habitat loss due to crop plantations, mining, dams, fragmentation, human settlement, hunting, road kills, deliberate fires, storms/flooding, landslides and

local trade for pets (Molur *et al.* 2003). The langur habitat is under severe biotic pressure in the form of wood cutting for fire wood (Sunderraj and Johnsingh 2001) which in turn affects the habitat in terms of reduction in food plants, loss of canopy continuity, lack of regeneration and recruitment of important food plants and overall change in habitat quality. The langur habitat in the Kalakad Mundanthurai Tiger Reserve is threatened due to the cutting of trees and removal of ground cover by the monthly and annual visits of pilgrims, while in Kerala the threats include large-scale poaching of the langurs for their supposed medicinal qualities.

The species has been listed under Appendix II of CITES. They are also protected under the Schedule I, Part I of Indian Wildlife Protection Act, 1972 and are listed as Vulnerable C2a (i) under IUCN Red data list.

Status in Captivity

The Nilgiri langur is part of the conservation breeding programme for prioritized threatened species, initiated by the Central Zoo Authority, New Delhi, India. Arignar Anna Zoological Park, Chennai and Sri Chamarajendra Zoological Garden, Mysore have been identified as the Co-ordinating and Participating institutions respectively. The first National Studbook for the species was established in the year 2011 (Malviya *et al.* 2011). The global captive population of the Nilgiri langur comprises of 24 individuals housed at 3 institutions in India and in Europe (ZIMS data until January 2015). This includes data from two Indian zoos located at Chennai and Mysore (20 living individuals) while records from three holding zoos (five living individuals) are still to be integrated in the ZIMS database.

Table 3: Status of Nilgiri langurs in Indian zoos

Location	Total no. of individuals (M.F.U)	Living individuals (M.F.U)	Time span during which Nilgiri langurs were kept (Years)	Births (M.F.U)	Deaths (M.F.U)
Ahmedabad	0.0.1	0.0.0	1972-91 (20)	0.0.0	0.0.1
Assam	4.3.0	0.0.0	1986-90 (5)	2.1.0	4.3.0
Guindy	2.1.0	0.0.0	1995-96 (2)	0.0.0	0.0.0
Hyderabad	5.3.0	0.1.0	1989-15 (27)	1.1.0	2.1.0
Junagadh	1.1.0	1.1.0	2012-15 (4)	0.0.0	0.0.0
Kanpur	1.0.0	0.0.0	1987 (1)	1.0.0	0.0.0
Madras	24.22.5	3.8.5	1984-15 (32)	18.17.5	12.4.0
Mysore	4.5.0	2.2.0	1996-15 (20)	1.1.0	2.3.0
Nandankanan	1.2.0	0.0.0	1987-12 (26)	0.0.0	1.2.0
Trivandrum	1.1.0	1.1.0	2002-15 (14)	0.0.0	0.0.0

Methods

Pedigree data was collected by means of questionnaires, zoo visits and from the websites of CZA and ZIMS (Zoological Information Management System). Questionnaires were sent to institutions housing the species 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 analysed using the population management program PMx *v* 1.2 (Ballou *et al*. 2011).

Scope of the Studbook and Data Quality

The second edition of the National Studbook of Nilgiri langur is current through December 2014. The studbook contains information received from Indian zoological institutions for specimens held currently or in the past and provides recommendations for selecting breeding pairs from the existing animals. Pedigree information was received from 8 out of 10 zoos (excluding Trivandrum and Guindy).

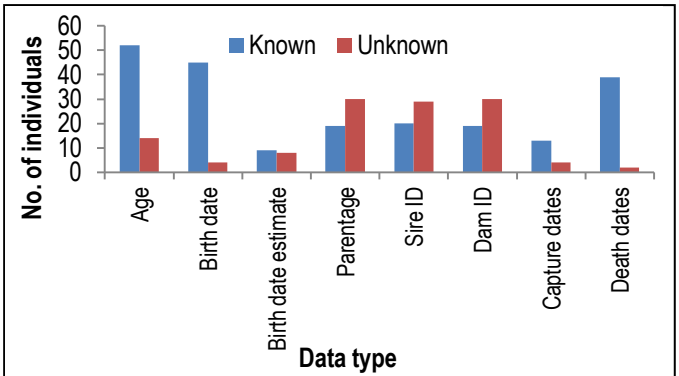


Figure 2: Data quality of records

The quality of data with reference to the Nilgiri langur captive population based on which analysis was carried out is summarized in Figure 2. Of the 66 individuals recorded in the studbook. Birth dates/estimates were known for nine wild and 45 captive-born individuals while complete parentage records were known for 19 individuals. For the captive-born individuals; sires were known for 20 while dams were known for 19 individuals and for wild-born individuals' birth date estimates were available for nine and date of acquisition were known for 13 individuals.

ANALYSIS

Demographic Analysis

Historical Population

Census trends

The National studbook records a total of 66 (32.28.6) animals in Indian institutions from 1972 to 2015. The captive population was initiated with a lone specimen housed at Kamla Nehru Zoological Garden, Ahmedabad. Origin based census trends (Figure 3) show that acquisition of wild origin animals from 1983 – 1995 and their progeny have led to the current population of 25 (7.13.5). The increase in population size after 1995 can be attributed to captive births. Sex based census trends (Figure 4) show a male bias prior to 1992. Thereafter a female biased sex ratio (current sex ratio = 1: 1.857) is observed

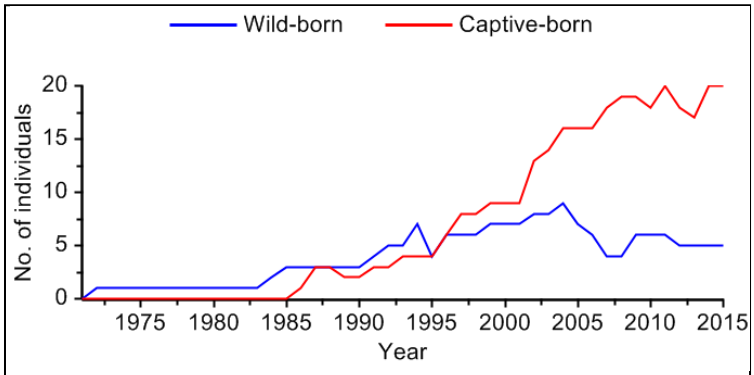


Figure 3: Origin-based census trends

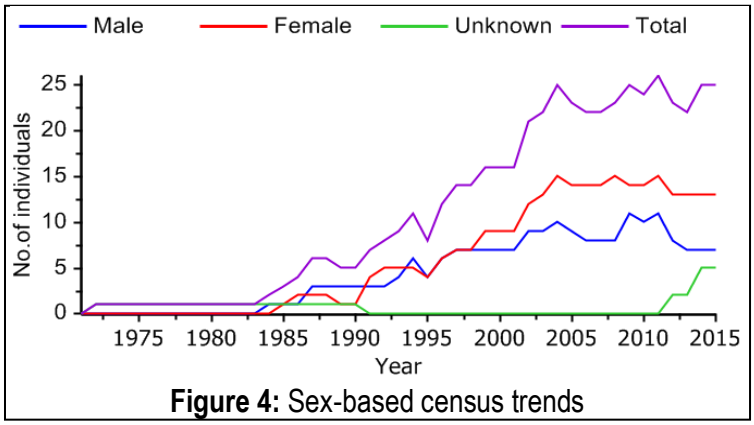


Figure 4: Sex-based census trends

owing to the skewed birth sex ratio favouring females. Overall the census trends indicate a slow growth rate in population; that can be attributed to the limited number of founders that have contributed to the growth of the population. The historical population is summarized as Table 4 and detailed chronology of events for each specimen are presented in Appendix I.

Table 4: Summary of the historical population

	Males	Females	Unknown	Total
Total studbook size	32	28	6	66
Total number of acquisitions from wild	9	7	1	17
Total number of births	23	21	5	49
Total number of births from unknown parents	14	11	5	30
Total number of deaths	21	13	1	35
Total number of breeding individuals	4	7	0	11
Wild-born that have bred	2	5	0	7
Captive-born that have bred	2	2	0	4

Living population

The living population includes 25 specimens (7.13.5); with 5 wild (2.3.0) and 20 captive-born individuals (5.10.5); distributed across five institutions: Arignar Anna Zoological Park, Chennai (3.8.5), Nehru Zoological Park, Hyderabad (0.1.0), Sakkarbaug Zoo, Junagadh (1.1.0), Sri Chamarajendra Zoological Garden, Mysore (2.2.0) and Trivandrum Zoo, Trivandrum (1.1.0). The details of the living population are summarized in table 5 and the detailed chronology of events for each living specimen is presented in Appendix II.

Table 5: Summary of the living population

	Male	Female	Unknown	Total
Total number of individuals	7	13	5	25
Total number of wild-born individuals	2	3	0	5
Total number of captive-born individuals	5	10	5	20
Total number of births from unknown parents	3	4	5	12
Total number of breeding individuals	0	3	0	3
Wild-born that have bred	0	2	0	2
Captive-born that have bred	0	1	0	1

Age-sex structure

The age distribution of the living individuals of a population provides insight into the future growth trends. Figure 5 represents the age distribution of the living captive Nilgiri langur population. The population includes a total of seven specimens in the pre-reproductive age (1.1.5); 14 specimens (6.8) in the reproductive age; however only three (0.3) have successfully reproduced in the past. The living population also includes four specimens (0.4) that have reached reproductive senescence. The age structure is suggestive of a low growth rate in the population due to the presence of a small number of reproductively active individuals in the population and the limited reproductive activity of specimens in the reproductively active ages.

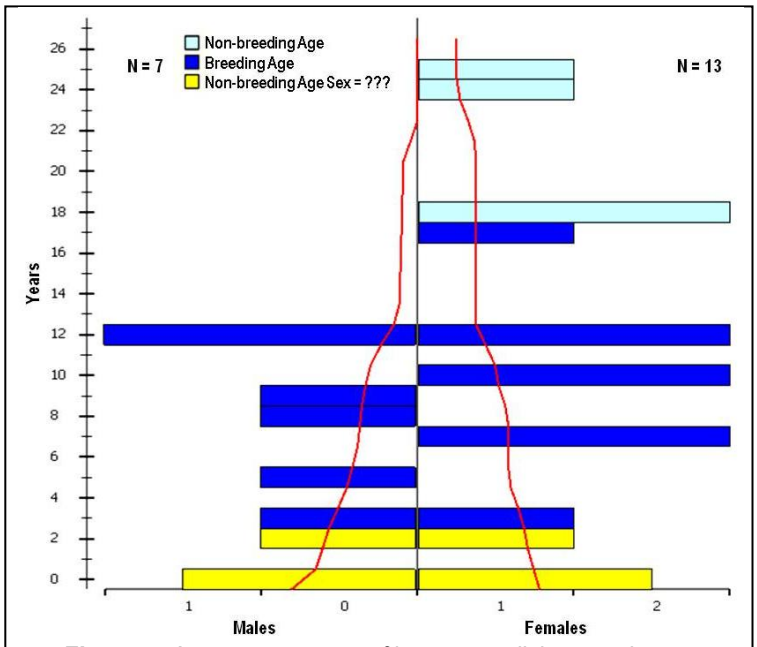


Figure 5: Age-sex structure of known age living specimens
Unknown sex individuals have been considered 0.5 of each sex

Population growth rates

The small sample size of the population restricts life-table analysis and limits the accuracy of population growth rates derived from the analyses. The growth rates summarized in Table 6 are only indicative in nature. The population shows a poor growth rate and a long generation time that limits recruitment. Population projections derived from life table analysis also indicate a limited population growth rate with a total projected population of only 26 individuals after 20 years.

Table 6: Population growth rates

Population rates	Male	Female	Mean
Instantaneous rate of change (r)	-0.001	0.036	0.018
Population growth rate (λ)	0.999	1.037	1.018
Generation time (T)	9.6	10.8	10.2
N at 20 years	9.7	16.6	26.3

Genetic Summary of the Nilgiri Langur Population

The population includes seventeen animals of wild origin however it has only seven founders (2.5) with six having a representation in the living population. Three additional wild origin animals are present in the population; however, only one of these is in the reproductively active age. The genetic status of the living population is summarized in Table 7. The current population of 25 (7.13.5) retains 83.64% of genetic diversity sampled. Measures of relatedness between individuals in the population – mean inbreeding

Table 7: Genetic summary

	Current	Potential
Founders	6 (Total 7)	3
Gene Diversity Retained	0.8364	0.9336
Founder Genome Equivalents	3.06	7.53
Population Mean Kinship	0.1636	
Mean Inbreeding Coefficient	0.0313	
% Ancestry Known	52%	
Effective Population Size	0.000	

coefficient of 0.0313 and population mean kinship of 0.1636 indicate breeding between closely related individuals in the population. Detailed genetic analysis of the population could not be performed due to absence of parentage records from a large portion of the captive-born individuals.

Population Management Goals

The maintenance of sustainable captive populations is dependent on identifying the minimum size required to be maintained in captivity and the supplementation with wild origin founders (number and frequency) to maintain genetic viability. Simulation using PMx Software (Ballou *et. al.* 2011) provides the necessary insights needed for developing a long term species-specific management plan.

Given below are the outcomes of the simulations carried out to assess the population size needed to be maintained in captivity and the supplementation with wild origin animals required to maintain a demographically stable and genetically viable captive population over the next 100 years. The simulation runs using the existing population without supplementation revealed that the population was not viable and would be unable to achieve the targets of maintain the desired population size as well as the desired genetic diversity.

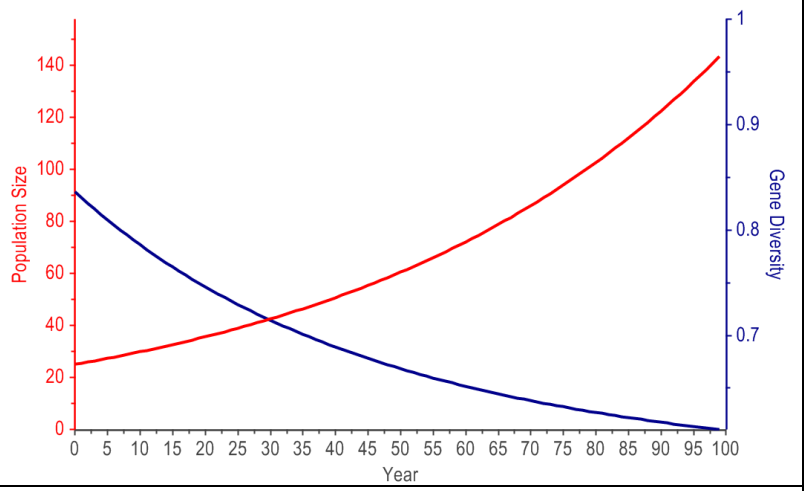
Population variables	**Simulation output**
Generation Length; 10.2 Maximum potential lambda; 1.0178 Current N; 25 Current Ne; 7.5 Ne/N; 0.30 Current Gene Diversity; 0.8364 Maximum N; 250 No founders added **Goal:** Retain 90.00 of the GD at the end of 100 years **Outcomes:** Goal not possible - Can maintain only 61.0%.	

Figure 6: Simulated viability of population without supplementation

Several simulations were run to ascertain the size of the population to be maintained in captivity and the number of animals and frequency of supplementation required for maintaining a genetically viable and demographically stable population. The simulation runs with supplementation by one effective founder every fifth year over the next 100 years ensured the maintenance of a viable *ex-situ* population with minimal impact on the *in-situ* population.

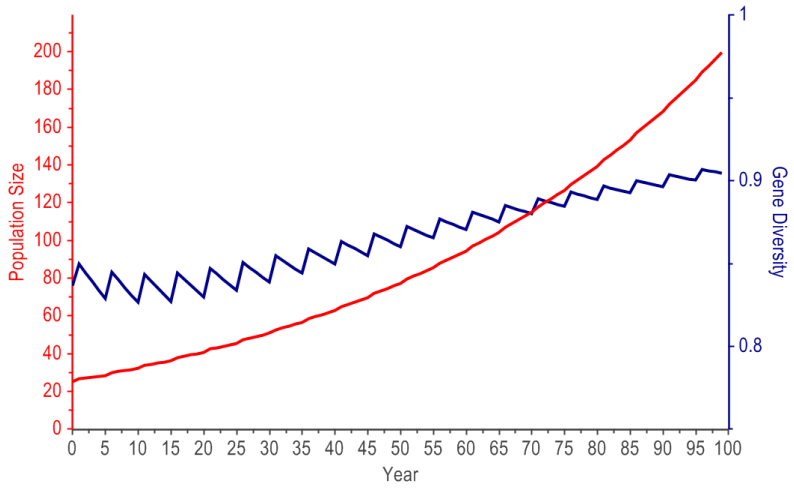
Population variables	Simulation output
Generation Length; 10.2 Maximum potential lambda; 1.0178 Current N; 25 Current Ne; 7.5 Ne/N; 0.30 Current Gene Diversity; 0.8364 Maximum N; 250 **Founder Related Variables** New founders per Addition event; 1 Year to start adding founders; 0 Years between events; 5 Year to stop adding founders; 100 FGE per Founder; 0.40 N per Founder; 1 **Goal:** Retain 90.00 of the GD at the end of 100 years **Outcomes:** Can exceed goals and maintain 90.4%	

Figure 7: Simulated viability of population with supplementation

Breeding Recommendations

The selection of breeding pairs in a conservation breeding programme is aimed at reducing the rate the loss of gene diversity from the population. The mating choices that maximize the retention of genetic diversity in the captive Nilgiri langur population were done using the Mate Suitability Index (See box for details). The recommended breeding pairs thus obtained are summarized in table 8. While exercising mating choices the holding zoos should take into consideration the mutual compatibility of the animals. A prior introduction and socialization period can help in overcoming compatibility issues.

Table 8: Recommended breeding pairs

Sire	Dam	MSI
00019	00010	3
00027	00021	1
	00009, 00010	2
00028	00009, 00010, 00021	1
	00014, 00015, 00057, 00060	3
	00013, 00023	4
00036	00021	1
	00009, 00010	2

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.

Conclusions

The species is listed as vulnerable in the IUCN Red list of threatened species and is susceptible to extinction due to habitat fragmentation and poaching. Maintenance of a genetically viable and demographically stable *ex-situ* population for insurance thus offers an option for ensuring their long term survival. The current *ex-situ* population is characterized by:

- **Limited reproductive output:** The population further has a poor reproductive output as is evinced by its long generation time (10.2 years) and low growth rate (0.018).
- **Small population size:** The living population has a small size (7.13.5.25) with a female-biased sex ratio. Further, only two institutions hold breeding populations in captivity; at all other institutions the species is held solitary or in pairs.
- **Limited founder representation:** The population had a total of 17 wild origin animals; however only seven contributed to the captive gene pool.
- **Poor records:** Large numbers of specimens in the population have incomplete records (percentage known is 52%) that limit the accuracy of analysis and arriving at meaningful conclusions that can assist in improving the management of the population.

The limited reproductive output of the current population is suggestive of shortcomings in the housing and husbandry practices for the species. These can be addressed by arriving at an understanding of the critical requirements of the species based on a review of existing information about the biology and behaviour of the species in literature. Pooling of specimens held solitary and in pairs with planned introduction and socialization can lead to the creation of an additional breeding troop of the species.

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Appendix I

Historical Population of *Semnopithecus johnii*

Sl. No	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
1.	00001	Unnamed	M	15-Jun-86	Unk	Unk	Madras Assam	15-Jun-86 ???? 01-May-87	Birth Transfer Death
2.	00002	Unnamed	M	15-Jun-86	Unk	Unk	Madras Assam	15-Jun-86 ???? 01-Aug-90	Birth Transfer Death
3.	00003	Unnamed	F	15-Jun-86	Unk	Unk	Madras Assam	15-Jun-86 ???? 29-Dec-90	Birth Transfer Death
4.	00004	Unnamed	F	15-Jun-86	Unk	Unk	Madras Assam	15-Jun-86 ???? 14-May-90	Birth Transfer Death
5.	00005	Unnamed	F	15-Jun-86	Unk	Unk	Assam	15-Jun-86 12-Feb-89	Birth Death
6.	00006	Gainda	M	17-Jun-87	Unk	Unk	Kanpur Hyderabad	17-Jun-87 01-Mar-03	Birth Ltf
7.	00007	Rajan	M	16-Feb-90	Unk	Unk	Hyderabad	16-Feb-90	Birth Ltf
8.	00008	Unnamed	M	07-May-90	Unk	Unk	Assam	07-May-90 09-Dec-90	Birth Death
9.	00009	Sumathra 100190 M01139	F	~ 1990	Wild	Wild	Tamil Nadu Madras Mysore	24-Nov-91 25-Nov-91 14-Oct-14	Capture Transfer Transfer
10.	00010	Kaikei 100193	F	~ 1989	Wild	Wild	Tamil Nadu Madras	24-Nov-91 25-Nov-91	Capture Transfer
11.	00011	Unnamed	M	24-Sep-90	Unk	Unk	Assam	24-Sep-90	Birth
								24-Sep-90	Death
12.	00012	Kannan 100196	M	17-May-96	00039	00040	Madras	17-May-96 25-Jul-09	Birth Death
13.	00013	Kavitha 100194	F	15-Jul-96	00039	00010	Madras	15-Jul-96	Birth
14.	00014	Kannahi 100195	F	16-Jul-96	00039	00009	Madras	16-Jul-96	Birth
15.	00015	Selvi	F	13-Mar-97	00039	00009	Madras	13-Mar-97	Birth
16.	00016	Gugan Aazp18	M	21-Nov-97	00039	00010	Madras Hyderabad	21-Nov-97 27-Sep-07 25-Jun-10	Birth Transfer Death
17.	00017	Janavi M00309 0006b73849	F	18-Apr-99	00031	00029	Mysore	18-Apr-99 14-Dec-11	Birth Death

Sl. No	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
18.	00018	Sekar 20182 0006b730e6	M	31-Mar-00	00039	00040	Madras Hyderabad	31-Mar-00 28-Sep-07 10-Sep-12	Birth Transfer Death
19.	00019	Ravi 100197	M	02-Mar-02	00012	00009	Madras	02-Mar-02	Birth
20. 21.	00020	Unnamed 100208 0006118eb2	M	~ 2002	Wild	Wild	India Guindy Madras	???? ???? 27-Jul-09 24-Apr-12	Capture Transfer Transfer Death
	00021	Remya	F	????	Wild	Wild	India Trivandrum	16-Aug-02 17-Aug-02	Capture Transfer
22.	00022	Nagabhushanam 20181 0006b72ee7	F	12-Dec-02	00012	00010	Madras Hyderabad	12-Dec-02 28-Sep-07 30-Apr-12	Birth Transfer Death
23.	00023	Unnamed 100199	F	04-Jan-03	00012	00013	Madras	04-Jan-03	Birth
24.	00024	Unnamed 100200	M	11-Feb-03	Unk	Unk	Madras Junagadh	11-Feb-03 10-Apr-12	Birth Transfer
25.	00025	Unnamed 100201	F	11-Mar-04	Unk	Unk	Madras Junagadh	11-Mar-04 10-Apr-12	Birth Transfer
26.	00026	Unnamed 100202	F	13-Jul-04	Unk	Unk	Madras	13-Jul-04	Birth
27.	00027	Reghu	M	????	Wild	Wild	India Trivandrum	24-Sep-04 25-Sep-04	Capture Transfer
28.	00028	Jeevan M00310 0006b73849	M	04-Jun-05	00031	00030	Mysore	04-Jun-05	Birth
29.	00029	Soniya M00739	F	~ 1995	Wild	Wild	India Mysore	22-Jun-96 22-Jun-96 25-Nov-07	Capture Transfer Death
30.	00030	Menaka M00740	F	~ 1997	Wild	Wild	India Mysore	21-Jun-99 21-Jun-99 02-Dec-07	Capture Transfer Death
31.	00031	Sanjay M00738	M	~ 1995	Wild	Wild	India Mysore	~ 1996 ~ 1996 15-Jun-06	Capture Transfer Death
32.	00032	Unnamed 100203	F	10-Mar-07	Unk	Unk	Madras	10-Mar-07	Birth
33.	00033	Unnamed 100204 M01138	F	05-Apr-07	Unk	Unk	Madras Mysore	05-Apr-07 14-Oct-14	Birth Transfer
34.	00034	Unnamed 100205	M	05-Feb-09	Unk	Unk	Madras	05-Feb-09 10-Aug-13	Birth Death

Sl. No	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
35.	00035	Unnamed 100206	M	05-Jun-09	Unk	Unk	Madras	05-Jun-09	Birth
36.	00036	Unnamed 100207	M	~ 2006	Wild	Wild	India Madras	18-Jul-09 18-Jul-09	Capture Transfer
37.	00037	Aazp31	F	25-Dec-08	Unk	Unk	Madras	25-Dec-08 05-Mar-09	Birth Death
38.	00038	Unnamed	?	????	Wild	Wild	India Ahmedabad	???? 27-Apr-72 18-Jun-91	Capture Transfer Death
39.	00039	Dasarathan 100192	M	~ 1982	Wild	Wild	India Madras	22-Dec-84 22-Dec-84 16-Jul-05	Capture Transfer Death
40.	00040	Kousalya 100191 98102057338	F	~ 1982	Wild	Wild	India Madras	28-Oct-85 28-Oct-85 25-May-05	Capture Transfer Death
41.	00041	Unnamed	M	????	Unk	Unk	Madras Nandankanan	???? 16-Oct-87 15-Mar-12	Birth Transfer Death
42.	00042	Unnamed	F	????	Unk	Unk	Madras Nandankanan	???? 16-Oct-87 02-Nov-87	Birth Transfer Death
43.	00043	Ravi	M	????	Unk	Unk	Madras Hyderabad	???? 12-May-89	Birth Ltf
44.	00044	Seetha	F	16-Jul-91	00039	00040	Madras Nandankanan	16-Jul-91 28-Feb-95 10-Jun-96	Birth Transfer Death
45.	00045	Unnamed	F	????	Wild	Wild	India Madras Hyderabad	24-Nov-92 24-Nov-92 26-Feb-95	Capture Transfer Ltf
46.	00046	Raman	M	06-Jul-93	00039	00040	Madras Guindy	06-Jul-93 ????	Birth Ltf
47.	00047	Lakshman	M	22-Dec-93	00039	00010	Madras	22-Dec-93 05-Mar-00	Birth Death
48.	00048	Valliappan	M	????	Wild	Wild	India Madras	13-Jan-94 13-Jan-94 16-Oct-95	Capture Transfer Death
49.	00049	Unnamed	M	26-Feb-94	00039	Unk	Madras	26-Feb-94 09-May-94	Birth Death
50.	00050	Mallaiyappan	M	????	Wild	Wild	India Madras	11-Jun-94 11-Jun-94 25-May-95	Capture Transfer Death
51.	00051	Unnamed	M	????	Wild	Wild	India Madras	11-Jun-94 11-Jun-94	Capture Transfer

Sl. No	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
								12-Jun-94	Death
52.	00052	Unnamed	M	09-Mar-95	00039	00010	Madras	09-Mar-95 24-Aug-95	Birth Death
53.	00053	Kalpana	F	01-Jun-95	00039	00040	Madras Guindy	01-Jun-95 ????	Birth Ltf
54.	00054	Karthik	M	????	Wild	Wild	India Mysore	???? ???? 15-Jun-06	Capture Transfer Death
55.	00055	Unnamed Aazp21	F	????	Unk	Unk	Ooty Madras	???? 01-Apr-01 26-May-01	Birth Transfer Death
56.	00056	Unnamed Aazp23	M	31-Jul-02	00012	00010	Madras	31-Jul-02 15-Mar-05	Birth Death
57.	00057	Unnamed 100198	F	12-Dec-02	00012	00010	Madras	12-Dec-02	Birth
58.	00058	Unnamed 100351	M	25-May-11	Unk	Unk	Madras	25-May-11 02-May-12	Birth Death
59.	00059	Unnamed 100352	F	10-Jun-11	Unk	Unk	Madras	10-Jun-11 15-Aug-12	Birth Death
60.	00060	Unnamed	F	12-Nov-11	00018	00022	Hyderabad	12-Nov-11	Birth
61.	00061	Unnamed 100353	M	16-Feb-12	Unk	Unk	Madras Mysore	16-Feb-12 14-Oct-14	Birth Transfer
62.	00062	Unnamed 100354	?	25-Apr-12	Unk	Unk	Madras	25-Apr-12	Birth
63.	00063	Unnamed 100355	?	25-Apr-12	Unk	Unk	Madras	25-Apr-12	Birth
64.	00064	Unnamed 100523	?	31-Mar-14	Unk	Unk	Madras	31-Mar-14	Birth
65.	00065	Unnamed	?	18-Apr-14	Unk	Unk	Madras	18-Apr-14	Birth
		100524							
66.	00066	Unnamed 100525	?	23-Apr-14	Unk	Unk	Madras	23-Apr-14	Birth
Totals: 32.28.6 (66)									

Appendix II

Living Population of *Semnopithecus Johnii*

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
Arignar Anna Zoological Park, Chennai									
1.	00010	Kaikei 100193	F	~ 1989	Wild	Wild	Tamilnadu Madras	24-Nov-91 25-Nov-91	Capture Transfer
2.	00013	Kavitha 100194	F	15-Jul-96	00039	00010	Madras	15-Jul-96	Birth
3.	00014	Kannahi 100195	F	16-Jul-96	00039	00009	Madras	16-Jul-96	Birth
4.	00015	Selvi	F	13-Mar-97	00039	00009	Madras	13-Mar-97	Birth
5.	00019	Ravi 100197	M	02-Mar-02	00012	00009	Madras	02-Mar-02	Birth
6.	00023	Unnamed 100199	F	04-Jan-03	00012	00013	Madras	04-Jan-03	Birth
7.	00026	Unnamed 100202	F	13-Jul-04	Unk	Unk	Madras	13-Jul-04	Birth
8.	00032	Unnamed 100203	F	10-Mar-07	Unk	Unk	Madras	10-Mar-07	Birth
9.	00035	Unnamed 100206	M	05-Jun-09	Unk	Unk	Madras	05-Jun-09	Birth
10.	00036	Unnamed	M	~ 2006	Wild	Wild	India	18-Jul-09	Capture
		100207					Madras	18-Jul-09	Transfer
11.	00057	Unnamed 100198	F	12-Dec-02	00012	00010	Madras	12-Dec-02	Birth
12.	00062	Unnamed 100354	?	25-Apr-12	Unk	Unk	Madras	25-Apr-12	Birth
13.	00063	Unnamed 100355	?	25-Apr-12	Unk	Unk	Madras	25-Apr-12	Birth
14.	00064	Unnamed 100523	?	31-Mar-14	Unk	Unk	Madras	31-Mar-14	Birth
15.	00065	Unnamed 100524	?	18-Apr-14	Unk	Unk	Madras	18-Apr-14	Birth
16.	00066	Unnamed 100525	?	23-Apr-14	Unk	Unk	Madras	23-Apr-14	Birth
Totals: 3.8. 5 (16)									
Nehru Zoological Park, Hyderabad									
1.	00060	Unnamed	F	12-Nov-11	00018	00022	Hyderabad	12-Nov-11	Birth
Totals: 0.1.0 (1)									
Sakkarbaug Zoo, Junagadh									
1.	00024	Unnamed 100200	M	11-Feb-03	Unk	Unk	Madras Junagadh	11-Feb-03 10-Apr-12	Birth Transfer
2.	00025	Unnamed	F	11-Mar-04	Unk	Unk	Madras	11-Mar-04	Birth

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
		100201					Junagadh	10-Apr-12	Transfer
Totals: 1.1. 0 (2)									
Sri Chamarajendra Zoological Garden, Mysore									
1.	00009	Sumathra 100190 M01139	F	~ 1990	Wild	Wild	Tamilnadu Madras Mysore	24-Nov-91 25-Nov-91 14-Oct-14	Capture Transfer Transfer
2.	00028	Jeevan M00310 0006b73849	M	04-Jun-05	00031	00030	Mysore	04-Jun-05	Birth
3.	00033	Unnamed 100204 M01138	F	05-Apr-07	Unk	Unk	Madras Mysore	05-Apr-07 14-Oct-14	Birth Transfer
4.	00061	Unnamed 100353	M	16-Feb-12	Unk	Unk	Madras Mysore	16-Feb-12 14-Oct-14	Birth Transfer
Totals: 2.2. 0 (4)									
Trivandrum Zoo, Trivandrum									
1.	00021	Remya	F	????	Wild	Wild	India Trivandrum	16-Aug-02 17-Aug-02	Capture Transfer
2.	00027	Reghu	M	????	Wild	Wild	India Trivandrum	24-Sep-04 25-Sep-04	Capture Transfer
Totals: 1.1. 0 (2)									
Totals: 7.13.5 (25)									
5 Institutions									

Appendix III

Pedigree Chart Report NILGIRI LANGUR Studbook

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00001
==========================================================================
                  UNK                                        UNK
                                \            /
                                 \          /                Sex: Male
                                  \        /       Birth Date: 15 Jun 1986
                                   \      Last Location: ASSAM     (dead)
                                 dam\    /sire    House Name:
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00001

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                  Studbook Number:  00002
==========================================================================
                  UNK                                        UNK
                                \            /
                                 \          /                Sex: Male
                                  \        /       Birth Date: 15 Jun 1986
                                   \    Last Location: ASSAM     (dead)
                                 dam\    /sire    House Name:
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00002



==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00003
==========================================================================
                  UNK                                        UNK
                                \            /
                                 \          /                Sex: Female
                                  \        /       Birth Date: 15 Jun 1986
                                   \      Last Location: ASSAM     (dead)
                                 dam\    /sire    House Name:
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00003


==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII               Studbook Number:  00004
==========================================================================
                  UNK                                        UNK
                                \            /
                                 \          /                Sex: Female
                                  \        /       Birth Date: 15 Jun 1986
                                   \      Last Location: ASSAM     (dead)
                                 dam\    /sire    House Name:
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00004
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00005
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Female
                                    \        /       Birth Date: 15 Jun 1986
                                     \      Last Location: ASSAM     (dead)
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                     00005

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00006
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date: 17 Jun 1987
                                     \      /     Last Location: HYDERABAD
                                   dam\    /sire     House Name: GAINDA
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                     00006

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII               Studbook Number:  00007
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date: 16 Feb 1990
                                     \      /     Last Location: HYDERABAD
                                   dam\    /sire     House Name: RAJAN
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                     00007

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00008
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date:  7 May 1990
                                     \      Last Location: ASSAM     (dead)
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                     00008
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00009
==========================================================================
                  WILD                                      WILD
                                  \            /
                                   \          /              Sex: Female
                                    \        /       Birth Date:      ~ 1990
                                     \      /     Last Location: MYSORE
                                   dam\    /sire    House Name: SUMATHRA
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00009

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00010
==========================================================================
                  WILD                                      WILD
                                  \            /
                                   \          /              Sex: Female
                                    \        /       Birth Date:      ~ 1989
                                     \      /     Last Location: MADRAS
                                   dam\    /sire    House Name: KAIKEI
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00010

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00011
==========================================================================
                  UNK                                       UNK
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date: 24 Sep 1990
                                     \     Last Location: ASSAM     (dead)
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00011

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00012
==========================================================================
       WILD                 WILD                 WILD                 WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
               00040  +                                   00039  +
               KOUSALYA                                   DASARATH
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date: 17 May 1996
                                     \     Last Location: MADRAS    (dead)
                                   dam\    /sire    House Name: KANNAN
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00012
+ Wild-caught...
```

```
================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                 Studbook Number:  00013
================================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
               00010  +                            00039  +
                KAIKEI                             DASARATH
                                \            /
                                 \          /            Sex: Female
                                  \        /      Birth Date: 15 Jul 1996
                                   \      /    Last Location: MADRAS
                                dam\    /sire    House Name: KAVITHA
                                    \  /            Tattoo:
                                     \/           Tag/Band:
                                  00013
+ Wild-caught...

================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                 Studbook Number:  00014
================================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
               00009  +                            00039  +
               SUMATHRA                            DASARATH
                                \            /
                                 \          /            Sex: Female
                                  \        /      Birth Date: 16 Jul 1996
                                   \      /    Last Location: MADRAS
                                dam\    /sire    House Name: KANNAHI
                                    \  /            Tattoo:
                                     \/           Tag/Band:
                                  00014
+ Wild-caught...

================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                 Studbook Number:  00015
================================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
               00009  +                            00039  +
               SUMATHRA                            DASARATH
                                \            /
                                 \          /            Sex: Female
                                  \        /      Birth Date: 13 Mar 1997
                                   \      /    Last Location: MADRAS
                                dam\    /sire    House Name: SELVI
                                    \  /            Tattoo:
                                     \/           Tag/Band:
                                  00015
+ Wild-caught...
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00016
==========================================================================
       WILD                 WILD                 WILD                 WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
               00010  +                                   00039  +
                KAIKEI                                    DASARATH
                                  \            /
                                   \          /             Sex: Male
                                    \        /      Birth Date: 21 Nov 1997
                                     \     Last Location: HYDERABAD (dead)
                                   dam\    /sire    House Name: GUGAN
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                     00016
+ Wild-caught...

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                  Studbook Number:  00017
==========================================================================
       WILD                 WILD                 WILD                 WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
               00029  +                                   00031  +
                SONIYA                                     SANJAY
                                  \            /
                                   \          /             Sex: Female
                                    \        /      Birth Date: 18 Apr 1999
                                     \     Last Location: MYSORE    (dead)
                                   dam\    /sire    House Name: JANAVI
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                     00017
+ Wild-caught...

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00018
==========================================================================
       WILD                 WILD                 WILD                 WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
               00040  +                                   00039  +
               KOUSALYA                                    DASARATH
                                  \            /
                                   \          /             Sex: Male
                                    \        /      Birth Date: 31 Mar 2000
                                     \     Last Location: HYDERABAD (dead)
                                   dam\    /sire    House Name: SEKAR
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                     00018
+ Wild-caught...
```

```
================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00019
================================================================================
                                      WILD      WILD      WILD      WILD
                                        dam\    /sire       dam\    /sire
                                            \  /                \  /
                                             \/                  \/
       WILD                WILD            00040  +            00039  +
                                            KOUSALYA            DASARATH
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                 00009  +                                00012
                 SUMATHRA                                 KANNAN
                                  \            /
                                   \          /            Sex: Male
                                    \        /      Birth Date:  2 Mar 2002
                                     \      /    Last Location: MADRAS
                                   dam\    /sire    House Name: RAVI
                                       \  /            Tattoo:
                                        \/           Tag/Band:
                                      00019
+ Wild-caught...

================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00020
================================================================================
                  WILD                                    WILD
                                  \            /
                                   \          /            Sex: Male
                                    \        /      Birth Date:      ~ 2002
                                     \      Last Location: MADRAS    (dead)
                                   dam\    /sire    House Name:
                                       \  /            Tattoo:
                                        \/           Tag/Band:
                                      00020

================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00021
================================================================================
                  WILD                                    WILD
                                  \            /
                                   \          /            Sex: Female
                                    \        /      Birth Date:    ????
                                     \      /    Last Location: TRIVANDRU
                                   dam\    /sire    House Name: REMYA
                                       \  /            Tattoo:
                                        \/           Tag/Band:
                                      00021
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00022
==========================================================================
                                      WILD      WILD      WILD      WILD
                                       dam\    /sire       dam\    /sire
                                           \  /                \  /
                                            \/                  \/
       WILD                WILD             00040  +            00039  +
                                            KOUSALYA            DASARATH
              dam\    /sire                             dam\    /sire
                  \  /                                      \  /
                   \/                                        \/
                 00010  +                                  00012
                  KAIKEI                                    KANNAN
                                \            /
                                 \          /            Sex: Female
                                  \        /      Birth Date: 12 Dec 2002
                                   \      /    Last Location: HYDERABAD (dead)
                                  dam\    /sire  House Name: NAGABHUSHANAM
                                      \  /            Tattoo:
                                       \/           Tag/Band:
+ Wild-caught...                     00022

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00023
==========================================================================
WILD      WILD      WILD      WILD      WILD      WILD      WILD      WILD
dam\    /sire       dam\    /sire       dam\    /sire       dam\    /sire
    \  /                \  /                \  /                \  /
     \/                  \/                  \/                  \/
   00010  +            00039 *+            00040  +            00039 *+
   KAIKEI              DASARATH            KOUSALYA            DASARATH
              dam\    /sire                             dam\    /sire
                  \  /                                      \  /
                   \/                                        \/
                 00013                                     00012
                 KAVITHA                                   KANNAN
                                \            /
                                 \          /            Sex: Female
                                  \        /      Birth Date:  4 Jan 2003
                                   \      /    Last Location: MADRAS
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                     00023
+ Wild-caught... * Appear more than once...

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00024
==========================================================================
                  UNK                                       UNK
                                \            /
                                 \          /            Sex: Male
                                  \        /      Birth Date: 11 Feb 2003
                                   \      /    Last Location: JUNAGADH
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                     00024
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00025
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Female
                                    \        /       Birth Date: 11 Mar 2004
                                     \      /     Last Location: JUNAGADH
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                      00025

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00026
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Female
                                    \        /       Birth Date: 13 Jul 2004
                                     \      /     Last Location: MADRAS
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                      00026

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00027
==========================================================================
                  WILD                                       WILD
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date:    ????
                                     \      /     Last Location: TRIVANDRU
                                   dam\    /sire     House Name: REGHU
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                      00027

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00028
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
               00030  +                                   00031  +
                MENAKA                                     SANJAY

                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date:  4 Jun 2005
                                     \      /     Last Location: MYSORE
                                   dam\    /sire     House Name: JEEVAN
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                      00028
+ Wild-caught...
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII               Studbook Number:  00029
==========================================================================
                 WILD                                       WILD
                                \            /
                                 \          /              Sex: Female
                                  \        /       Birth Date:      ~ 1995
                                   \   Last Location: MYSORE    (dead)
                                 dam\    /sire    House Name: SONIYA
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00029

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII               Studbook Number:  00030
==========================================================================
                 WILD                                       WILD
                                \            /
                                 \          /              Sex: Female
                                  \        /       Birth Date:      ~ 1997
                                   \     Last Location: MYSORE    (dead)
                                 dam\    /sire    House Name: MENAKA
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00030

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII               Studbook Number:  00031
==========================================================================
                 WILD                                       WILD
                                \            /
                                 \          /              Sex: Male
                                  \        /       Birth Date:      ~ 1995
                                   \     Last Location: MYSORE    (dead)
                                 dam\    /sire    House Name: SANJAY
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00031

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII               Studbook Number:  00032
==========================================================================
                 UNK                                        UNK
                                \            /
                                 \          /              Sex: Female
                                  \        /       Birth Date: 10 Mar 2007
                                   \      /    Last Location: MADRAS
                                 dam\    /sire    House Name:
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00032
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00033
==========================================================================
                 UNK                                        UNK
                                \            /
                                 \          /              Sex: Female
                                  \        /       Birth Date:  5 Apr 2007
                                   \      /     Last Location: MYSORE
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                     00033

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00034
==========================================================================
                 UNK                                        UNK
                                \            /
                                 \          /              Sex: Male
                                  \        /       Birth Date:  5 Feb 2009
                                   \     Last Location: MADRAS    (dead)
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                     00034

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII               Studbook Number:  00035
==========================================================================
                 UNK                                        UNK
                                \            /
                                 \          /              Sex: Male
                                  \        /       Birth Date:  5 Jun 2009
                                   \      /     Last Location: MADRAS
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                     00035

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00036
==========================================================================
                 WILD                                       WILD
                                \            /
                                 \          /              Sex: Male
                                  \        /       Birth Date:      ~ 2006
                                   \      /     Last Location: MADRAS
                                  dam\    /sire    House Name:
                                      \  /             Tattoo:
                                       \/            Tag/Band:
                                     00036
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00037
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Female
                                    \        /       Birth Date: 25 Dec 2008
                                     \      /    Last Location: MADRAS    (dead)
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00037
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00038
==========================================================================
                  WILD                                       WILD
                                  \            /
                                   \          /              Sex: Unknown
                                    \        /       Birth Date:    ????
                                     \    /    Last Location: AHMEDABAD (dead)
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00038

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00039
==========================================================================
                  WILD                                       WILD
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date:      ~ 1982
                                     \      /    Last Location: MADRAS    (dead)
                                   dam\    /sire    House Name: DASARATHAN
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00039

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00040
==========================================================================
                  WILD                                       WILD
                                  \            /
                                   \          /              Sex: Female
                                    \        /       Birth Date:      ~ 1982
                                     \   Last Location: MADRAS    (dead)
                                   dam\    /sire    House Name: KOUSALYA
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00040
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00041
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date:    ????
                                     \     Last Location: NANDANKAN (dead)
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00041

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00042
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Female
                                    \        /       Birth Date:    ????
                                     \     Last Location: NANDANKAN (dead)
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00042

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00043
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date:    ????
                                     \      /    Last Location: HYDERABAD
                                   dam\    /sire    House Name: Ravi
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00043

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00044
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
                00040  +                                   00039  +
                KOUSALYA                                   DASARATH
                                  \            /
                                   \          /              Sex: Female
                                    \        /       Birth Date: 16 Jul 1991
                                     \      Last Location: NANDANKAN (dead)
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00044

+ Wild-caught...
```

```
================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                 Studbook Number:  00045
================================================================================
                  WILD                                      WILD
                                \            /
                                 \          /            Sex: Female
                                  \        /      Birth Date:    ????
                                   \      /    Last Location: HYDERABAD
                                  dam\    /sire    House Name:
                                      \  /            Tattoo:
                                       \/           Tag/Band:
                                     00045

================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                 Studbook Number:  00046
================================================================================
       WILD                 WILD                 WILD                 WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
             00040  +                                   00039  +
             KOUSALYA                                   DASARATH
                                \            /
                                 \          /            Sex: Male
                                  \        /      Birth Date:  6 Jul 1993
                                   \      /    Last Location: GUINDY
                                  dam\    /sire    House Name: RAMAN
                                      \  /            Tattoo:
                                       \/           Tag/Band:
                                     00046
+ Wild-caught...

================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                 Studbook Number:  00047
================================================================================
       WILD                 WILD                 WILD                 WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
             00010  +                                   00039  +
              KAIKEI                                    DASARATH
                                \            /
                                 \          /            Sex: Male
                                  \        /      Birth Date: 22 Dec 1993
                                   \     Last Location: MADRAS    (dead)
                                  dam\    /sire    House Name: LAKSHMAN
                                      \  /            Tattoo:
                                       \/           Tag/Band:
                                     00047
+ Wild-caught...
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00048
==========================================================================
                  WILD                                    WILD
                                \             /
                                 \           /             Sex: Male
                                  \         /      Birth Date:    ????
                                   \     Last Location: MADRAS    (dead)
                                 dam\    /sire    House Name: Valliappan
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00048

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00049
==========================================================================
                                              WILD                  WILD
                                                    dam\    /sire
                                                        \  /
                                                         \/
                  UNK                                   00039  +
                                                        DASARATH
                                \             /
                                 \           /             Sex: Male
                                  \         /      Birth Date: 26 Feb 1994
                                   \     Last Location: MADRAS    (dead)
                                 dam\    /sire    House Name:
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00049
+ Wild-caught...

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00050
==========================================================================
                  WILD                                    WILD
                                \             /
                                 \           /             Sex: Male
                                  \         /      Birth Date:    ????
                                   \     Last Location: MADRAS    (dead)
                                 dam\    /sire   House Name: MALLAIYAPPAN
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00050

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00051
==========================================================================
                  WILD                                    WILD
                                \             /
                                 \           /             Sex: Male
                                  \         /      Birth Date:    ????
                                   \     Last Location: MADRAS    (dead)
                                 dam\    /sire    House Name:
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00051
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00052
==========================================================================
       WILD                 WILD                 WILD                 WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
                00010  +                                   00039  +
                 KAIKEI                                    DASARATH
                                \            /
                                 \          /            Sex: Male
                                  \        /     Birth Date:  9 Mar 1995
                                    \Last Location: MADRAS    (dead)
                                dam\    /sire    House Name:
                                    \  /            Tattoo:
                                     \/           Tag/Band:
                                   00052
+ Wild-caught...

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00053
==========================================================================
       WILD                 WILD                 WILD                 WILD
             dam\    /sire                              dam\    /sire
                 \  /                                       \  /
                  \/                                         \/
                00040  +                                   00039  +
                KOUSALYA                                   DASARATH
                                \            /
                                 \          /            Sex: Female
                                  \        /     Birth Date:  1 Jun 1995
                                   \      /    Last Location: GUINDY
                                dam\    /sire    House Name: KALPANA
                                    \  /            Tattoo:
                                     \/           Tag/Band:
                                   00053
+ Wild-caught...

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00054
==========================================================================
                WILD                                       WILD
                                \            /
                                 \          /            Sex: Male
                                  \        /     Birth Date:    ????
                                   \   Last Location: MYSORE    (dead)
                                dam\    /sire    House Name: KARTHIK
                                    \  /            Tattoo:
                                     \/           Tag/Band:
                                   00054
```

```
================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00055
================================================================================
                 UNK                                        UNK
                                  \            /
                                   \          /             Sex: Female
                                    \        /      Birth Date:    ????
                                     \     Last Location: MADRAS    (dead)
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
                                      00055

================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00056
================================================================================
                                       WILD      WILD      WILD      WILD
                                        dam\    /sire       dam\    /sire
                                            \  /                \  /
                                             \/                  \/
      WILD                WILD              00040  +             00039  +
                                            KOUSALYA             DASARATH
            dam\    /sire                                dam\    /sire
                \  /                                         \  /
                 \/                                           \/
              00010  +                                     00012
               KAIKEI                                       KANNAN
                                  \            /
                                   \          /             Sex: Male
                                    \        /      Birth Date: 31 Jul 2002
                                     \     Last Location: MADRAS    (dead)
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
+ Wild-caught...                      00056

================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00057
================================================================================
                                       WILD      WILD      WILD      WILD
                                       dam\    /sire       dam\    /sire
                                           \  /                \  /
                                            \/                  \/
      WILD                WILD             00040  +             00039  +
                                           KOUSALYA             DASARATH
            dam\    /sire                                dam\    /sire
                \  /                                         \  /
                 \/                                           \/
              00010  +                                     00012
               KAIKEI                                       KANNAN
                                  \            /
                                   \          /             Sex: Female
                                    \        /      Birth Date: 12 Dec 2002
                                     \      /    Last Location: MADRAS
                                   dam\    /sire    House Name:
                                       \  /             Tattoo:
                                        \/            Tag/Band:
+ Wild-caught...                      00057
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00058
==========================================================================
                  UNK                                        UNK
                                    \            /
                                     \          /             Sex: Male
                                      \        /      Birth Date: 25 May 2011
                                       \     Last Location: MADRAS    (dead)
                                     dam\    /sire    House Name:
                                         \  /             Tattoo:
                                          \/            Tag/Band:
                                        00058

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00059
==========================================================================
                  UNK                                        UNK
                                    \            /
                                     \          /             Sex: Female
                                      \        /      Birth Date: 10 Jun 2011
                                       \     Last Location: MADRAS    (dead)
                                     dam\    /sire    House Name:
                                         \  /             Tattoo:
                                          \/            Tag/Band:
                                        00059

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00060
==========================================================================
                           ^          ^
                           |          |
WILD      WILD     00040 *+  00039 *+   WILD      WILD     WILD      WILD
                  KOUSALYA  DASARATH
dam\    /sire       dam\    /sire       dam\    /sire       dam\    /sire
    \  /                \  /                \  /                \  /
     \/                  \/                  \/                  \/
   00010  +            00012               00040 *+            00039 *+
    KAIKEI              KANNAN              KOUSALYA            DASARATH
              dam\    /sire                           dam\    /sire
                  \  /                                    \  /
                   \/                                      \/
                 00022                                   00018
                 NAGABHUS                                SEKAR
                                    \            /
                                     \          /             Sex: Female
                                      \        /      Birth Date: 12 Nov 2011
                                       \      /    Last Location: HYDERABAD
                                     dam\    /sire    House Name:
                                         \  /             Tattoo:
                                          \/            Tag/Band:
                                        00060
+ Wild-caught... * Appear more than once...
^ Pedigree continues beyond top of page...
```

```
==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00061
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Male
                                    \        /       Birth Date: 16 Feb 2012
                                     \      /     Last Location: MYSORE
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                     00061

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                  Studbook Number:  00062
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Unknown
                                    \        /       Birth Date: 25 Apr 2012
                                     \      /     Last Location: MADRAS
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                     00062

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00063
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Unknown
                                    \        /       Birth Date: 25 Apr 2012
                                     \      /     Last Location: MADRAS
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                     00063

==========================================================================
Taxon Name: TRACHYPITHECUS JOHNII              Studbook Number:  00064
==========================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Unknown
                                    \        /       Birth Date: 31 Mar 2014
                                     \      /     Last Location: MADRAS
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                     00064
```

```
================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00065
================================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Unknown
                                    \        /       Birth Date: 18 Apr 2014
                                     \      /     Last Location: MADRAS
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                      00065

================================================================================
Taxon Name: TRACHYPITHECUS JOHNII                Studbook Number:  00066
================================================================================
                  UNK                                        UNK
                                  \            /
                                   \          /              Sex: Unknown
                                    \        /       Birth Date: 23 Apr 2014
                                     \      /     Last Location: MADRAS
                                   dam\    /sire     House Name:
                                       \  /              Tattoo:
                                        \/             Tag/Band:
                                      00066
```