NATIONAL STUDBOOK

CLOUDED LEOPARD *(Neofelis nebulosa)*

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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FOREWORD

For species threatened with extinction in their natural habitats *ex-situ* conservation offers an opportunity for ensuring their long-term survival. Maintaining genetically viable and demographically stable populations in captivity can ensure their sustained survival. This can be ensured by using pedigree information contained in studbooks that form the key to understanding the demographic and genetic structure of populations and taking corrective actions as required for effective management of captive populations. Studbooks also provide an insight into the mating choices that can be exercised to maximize retention of genetic diversity.

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

As a part of the project outcomes, the WII has compiled and updated the National studbook for Clouded leopard *(Neofelis nebulosa)* in Indian zoos. The population management recommendations contained in the studbook should form the basis for the long term management of the species in captivity. It is hoped that the zoos will adopt the recommendations and keep the WII informed of changes in their populations on a regular basis to enable the timely update of the studbook.

(B.S. Bonal, I.F.S.)
Member Secretary
Central Zoo Authority

ACKNOWLEDGEMENT

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1. Aizawl Zoo, Aizawl
2. Biological Park, Itanagar
3. Himalayan Zoological Park, Gangtok
4. Kamla Nehru Zoological Garden, Ahmedabad
5. Kanpur Zoological Park, Kanpur
6. Lady Hydari Park Animal Land, Shillong
7. Nagaland Zoological Park, Dimapur
8. Padmaja Naidu Himalayan Zoological Park, Darjeeling
9. Sanjay Gandhi Biological Park
10. Sepahijala Zoological Park, Agartala

Authors

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Species biology

Taxonomy

Phylum:	Chordata
Class:	Mammalia
Order:	Carnivora
Family:	Felidae
Sub-family:	Pantherinae
Genus:	Neofelis (Gray 1867)
Species:	*Neofelis nebulosa* (Griffith 1821)

The genus *Neofelis* was traditionally considered to be a monotypic genera with a single species *Neofelis nebulosa* (Griffith 1821), including four subspecies, *N. n. diardi* (Cuvier 1823), *N. n. macrosceloides* (Hodgson in Gray 1853), *N. n. nebulosa*, and *N. n. brachyura* (Swinhoe 1862). Pocock in (1917) and Wilting *et. al*. (2007) commented on the limited understanding of the taxonomy and phylogeny of the species.

Cladistic studies based on osteological and dental characters of felids suggest that clouded leopard is the most basal Pantherinae and lineages of *Neofelis* and *Panthera* diverged approximately 6 million years ago (MYA) (Johnson and O'Brien 1997; Mattern and McLennan 2000; Yu and Zhang 2005; Johnson *et al.* 2006). Based on morphometric analysis of pelages by Kitchener *et al.* (2006) and genetic analysis by Buckley-Beason *et al.* (2006), the taxonomic status of the species was revised. Two of the sub-species *N. n. nebulosa* and *N. n. diardii* were elevated to full species status and renamed as *Neofelis nebulosa,* restricted to mainland Southeast Asia and *Neofelis diardi,* inhabiting the islands of Sumatra and Borneo respectively. The other two subspecies were discarded following this revision. Based on mtDNA and microsatellite data, Wilting *et al. (*2007) confirmed the reproductive isolation of *N. diardii* from *N. Nebulosa* and confirmed their status as distinct species.

Physical features

Clouded leopards are medium-sized felid, with males weighing from 16 to 18 kg and females weighing between 11.5 to 13.5 kg (Grassman *et al.* 2005, Austin and Tewes 1999). They have distinct cloud shaped patches on their pale-yellow to brown coloured fur that camouflages them in dense forests (Sunquist and Sunquist 2002). An elongated long tail, large paws and flexible joints in their hind feet assists them in arboreal life (Sunquist and Sunquist 2002). They are also unique in possessing the longest canine teeth in proportion to their size of all cats (Brakefield 1993).

Habitat and Ecology

The preferred habitat of the species is dense evergreen forest (Fletchall 2000); however they are also reported from other habitats, like, scrub, grassland, dry tropical forests, mangrove swamps, hill evergreen forest and mixed deciduous forests (Nowell and Jackson 1996). They are found in the Himalayas up to 2,500 - 3,000 m.

Clouded leopards are solitary and predominantly nocturnal with crepuscular activity peaks (Griffiths 1993, Sunquist and Sunquist 2002, Grassman *et al.* 2005, Austin et al. 2007). They are adapted to both arboreal and terrestrial modes of life (Grassman *et al.* 2005, Azlan *et al.* 2009); however studies suggest clouded leopards to be more terrestrial (Rabinowitz *et al*. 1987; Dinerstein and Mehta 1989; Austin and Tewes 1999) with the use of trees mainly for resting (Rabinowitz *et al.* 1987; Davies 1990).

Home ranges of radio-collared clouded leopards (N=2 and N=4) in Khao Yai National Park and Phu Khieo Wildlife Sanctuary, Thailand were estimated at 25.7 km² - 42 km² (Austin *et al*. 2007) and 22.9 km²-49.1 km² (Grassman *et al.* 2005) respectively. In Khao Yai National Park, they had a mean daily movement of 976m (Austin *et al.* 2007).

Clouded leopards are predatory carnivores with a diverse prey base. They have been reported to prey on primates such as pig-tailed macaques, slow loris and gibbons in Thailand (Nowell and Jackson 1996, Grassman *et al.* 2005). In Malaysia, the prey species includes palm civets, gray leaf monkeys, birds, squirrels, fish, porcupines, sambar deer, barking deer, mouse deer, and wild boar (Sunquist and Sunquist 2002). Muntjac, and Argus pheasant form the main prey base in Nepal (Nowell and Jackson 1996). Limited information on their hunting behaviour is available; it is however believed that clouded leopards stalk their prey along the ground and ambush them from the trees (Fletchall 2000).

Social and breeding behaviour

Limited information on the behaviour of the species in the free ranging condition exists in literature due to its secretive nature and difficulty of locating it in its dense habitat. Most reports are anecdotal (Selous and Banks 1935), based on sighting reports or studies in captivity (Yamada and Durrant 1989; Nowell and Jackson 1990).

Clouded leopards exhibit variability in estrous cycle length. They can be both induced and spontaneous ovulators and estrous is not easily recognizable due to their secretive behaviour (Howard *et al.* 1996; Pelican *et al.* 2006). Many females do not show marked behavioural changes while others display lordosis, treading and rolling (Fazio 2010).

Females have a mean gestation length of 89.2 days and the estrous cycle takes place for 24 days with estrous lasting for 6 days (Brown *et al.* 1995). Behavioural observations of captive Clouded leopards showed that reproductively successful individuals were more responsive and vocal and spent less time out of sight and more time resting (Brown *et al.* 1995). A variety of "territorial" behaviours were exhibited by the reproductively successful males, such as "patrolling" and "defecation". Studies by Wildt *et al.* (1986) and Yamada and Durrant (1989) suggest peak reproductive activity to occur during October to February.

A problem commonly faced by zoos holding clouded leopards is the incompatibility between paired individuals leading to injuries and even killing of the females by the males. Additionally less than 20% of adult females listed in the 'International Clouded Leopard Studbook' have reproduced successfully (Yamada and Durrant 1989). Studies suggest that pairing males and females at a young age, while still prepubertal and preferably before six months, help them bond better (Baudy 1971, Geidel and Gensch 1976, Fletchall 2007). Hand-reared cubs are calmer and have been found to be better suited for captive propagation (Wielebnowski et al. 2002). However, the utility of such animals for *ex-situ* conservation is questionable as this can lead to the creation of behavioural artefacts of captivity leaving the animals unfit for natural reproduction.

Table 1: Life history traits of Clouded leopards

Age at first reproduction	22-36 months
Mean gestation length	89.2 days
Birth seasonality	March-August (in captivity in China)
Litter size	2-3 cubs/litter
Life-span	11 years; 16-17 years in captivity

Distribution

The range of clouded leopards extends from eastern and southern foothills of the Himalayas in Nepal (Dinerstein and Mehta 1989), through Bhutan and India (Arunachal Pradesh, Sikkim; Assam) (Mishra *et al.* 2006) south to Myanmar, southern China, Taiwan, Vietnam, Laos, Thailand, peninsular Malaysia (Azlan and Sharma 2006; Wilting *et al.* 2006) and Cambodia (Sunquist and Sunquist 2002). They historically had a wide distribution in China, south of the Yangtze, but limited information on recent records from China are available (Wozencraft *et al.* 2008). It has also been reported from Bangladesh (Khan 2004), however; it is extinct in Taiwan (Anon. 1996). The Sundaland clouded leopards *Neofelis diardi* are found in the islands of Sumatra and Borneo (Buckley-Beason *et al.* 2006, Kitchener *et al.* 2006).

Figure 1: Geographic range of *Neofelis nebulosa* (Sanderson *et al.* 2008)

Threats and conservation status

The species is threatened by habitat destruction and degradation resulting in prey-base reduction, and poaching for trade in body parts and pelts. The animals are also killed for meat for exotic dishes throughout Asia and Europe (Low 1991, Nowell and Jackson 1996 Hearn *et al.* 2008).

The clouded leopard was classified as “vulnerable” by the International Union for Conservation of Nature (IUCN) Endangered Species commission due to an estimated population of less than 10,000 mature individuals in the wild, with a predicted or observed declining trend (Sanderson *et al.* 2008) and due to exploitation and a decline in area and quality of habitat (Nowell and Jackson 1996). It has been listed on Appendix I by the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES) (UNEP-WCMC, 2009) which prohibits international trade of this species. In India it is listed in Schedule I of the Indian Wildlife (Protection) Act, 1972.

Status in captivity

The global captive population of clouded leopard consists of 188 (85. 98.5) individuals housed in 64 institutions across 3 continents (ZIMS data current as on 15th September 2014). The species is being maintained in captivity in India as part of the Conservation Breeding Programme (CBP), in Europe as part of the European Endangered Species Breeding Programme (EEP) and as part of the Species Survival Plan (SSP) in North America. The total global population as on 15th September 2014 is shown in Figure 2.

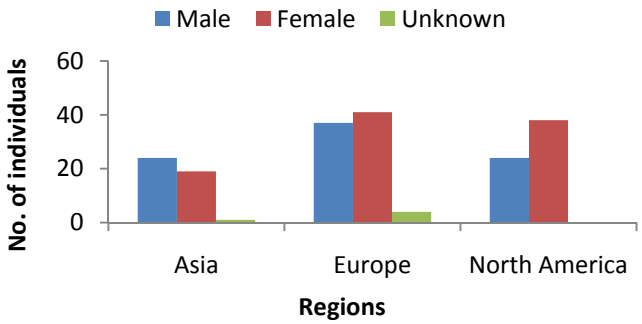


Figure 2: Global distribution of Clouded leopard in captivity

Clouded leopards have been maintained in captivity since early 1900s across the world; however, the first successful zoo births were documented in the late 1950s. The clouded leopard SSP was formed in 1989, to address the various issues concerning the stabilization of the population; improving genetic management and developing conservation efforts in clouded leopard range countries. The first studbook for this species was established in the 1970's. In 1998, the clouded leopard captive population was declared as a research population due to impaired reproduction caused by incompatibility of potential mates.

Table 2: Status of Clouded leopards in Indian zoos

Sl. No.	Location	Total Individuals (M.F.U)	Living Individuals (M.F.U)	Time span during which Clouded leopards were maintained in captivity (Years)	Births (M.F.U)	Deaths (M.F.U)
1.	Ahmedabad	1.1.0	0.0.0	7 (1985-1992)	0.0.0	1.0.0
2.	Aizawl	0.1.0	0.1.0	8 (2006-2014)	0.0.0	0.0.0
3.	Assam	2.0.0	0.0.0	18 (1992-2010)	0.0.0	2.0.0
4.	Darjeeling	1.3.0	1.2.0	5 (1996-2014)	0.0.0	0.1.0
5.	Dimapur	1.1.0	0.0.0	3 (2008-2011)	0.0.0	1.1.0
6.	Gangtok	1.0.0	1.0.0	4 (2010-2014)	0.0.0	0.0.0
7.	Itanagar	1.2.0	1.2.0	5 (2009-2014)	0.0.0	0.0.0
8.	Kanpur	0.1.0	0.0.0	0 (1994)	0.0.0	0.0.0
9.	Patna	1.0.0	0.0.0	7 (1996-2003)	0.0.0	0.0.0
10.	Sepahijala	16.22.3	7.10.1	18 (1996-2014)	9.16.3	1.0.0
11.	Shillong	0.1.0	0.1.0	2 (2012-2014)	0.0.0	7.7.2

Methods

Data on individual history was collected by means of questionnaires, zoo visits and from the websites of CZA and ZIMS (Zoological Information Management System). Questionnaires were sent to the institutions housing Clouded leopards in India, requesting information for each captive specimen. Data was entered in the Single Population Analysis and Records Keeping System (SPARKS *v* 1.66) (ISIS 2004) and subsequently exported to population management programme PMx *v* 1.2 (Ballou *et al.* 2011) for further analysis. Visualization of the pedigree and age-structure of the population was performed using the statistical package R *v* 3.1.1 (R Development core team 2013).

Scope of the studbook and data quality

The current edition of the Clouded leopard national studbook represents the history of the species (*Neofelis nebulosa*) in Indian zoos and is current through 31 December 2013. The data availability for the population with respect to compilation of the studbook is summarized in Figure 3. A total of 53 individuals are registered in the Studbook as per records provided by holding zoos. The ages of 40 individuals are known; this includes 13 wild origin animals for which birth date estimates were made available by holding zoos. The studbook further includes 10 wild origin animals for which birth date estimates were unavailable and two animals of unknown origin and dates of entry.

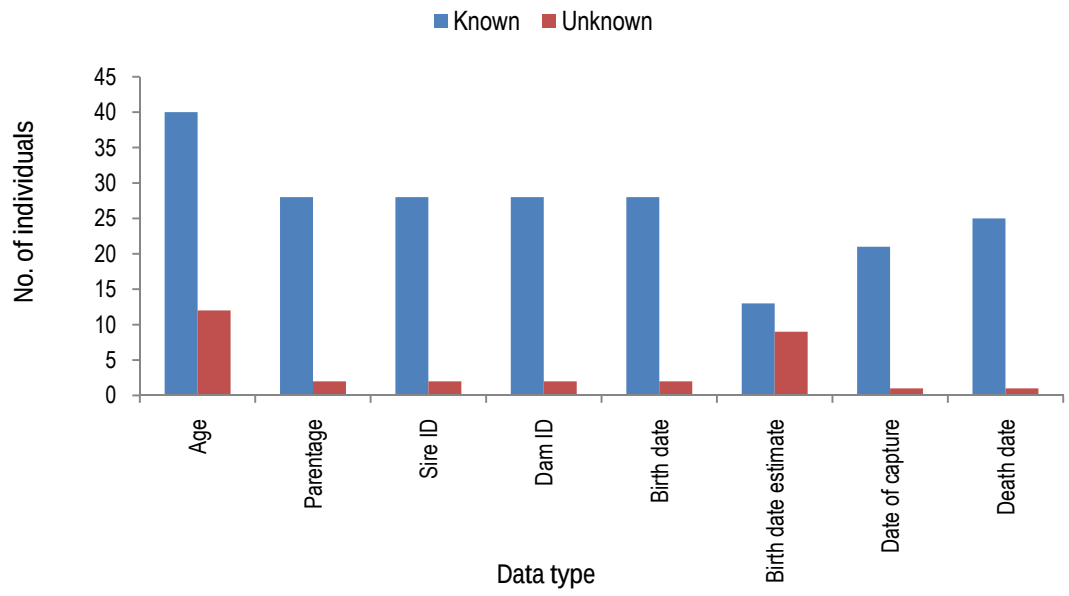


Figure 3: Data quality for captive specimens of Clouded leopards

ANALYSIS

Demographic Analysis

Historical population

Census trends

The studbook lists 53 (23.27.3) specimens held at 11 Indian institutions since 1985. Included are 23 (13.10.0) wild-born, 28 (9.16.3) captive-born and 2 (1.1.0) unknown-origin individuals (Table 3). The census trends of the captive population based on origin and sex are depicted in Figures 4 and 5 respectively. The captive population in Indian zoos was initiated with 2 unknown origin individuals housed at Ahmedabad Zoo (1985-1994). Acquisition of wild-born individuals led to the increase in population from 1994 (N = 1) to 2001 (N = 10) (Figure 4). The first captive births were that of two cubs recorded in 2001 at Sepahijala; however, one cub survived for less than one month while the other survived for less than one year (depicted as a peak and a trough between 2001 – 2002 in Figures 4 and 5).

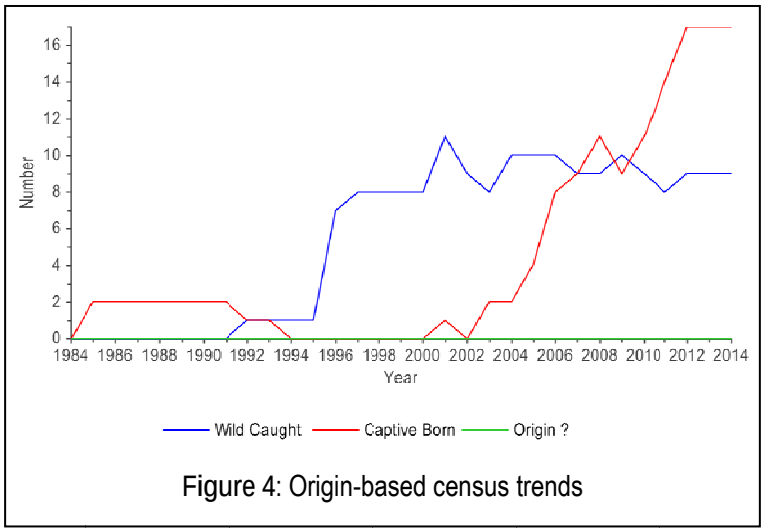


Figure 4: Origin-based census trends

Overall the population remained small with a median of only 7.5 individuals ($9.96_{Mean} \pm 8.45_{SD}$) recorded per year. The mean annual birth rate (8.09%) was lower than the mean annual mortality rate (9.64%). The decline in population was offset by acquisitions from the wild that are responsible for the increase in population size. The origin based census trends from 2005 onwards show an increase in the proportion of the captive-born individuals in the captive (Figure 4). The sex-based census trends (Figure 5) show a female bias in sex ratio from 2002 onwards. The

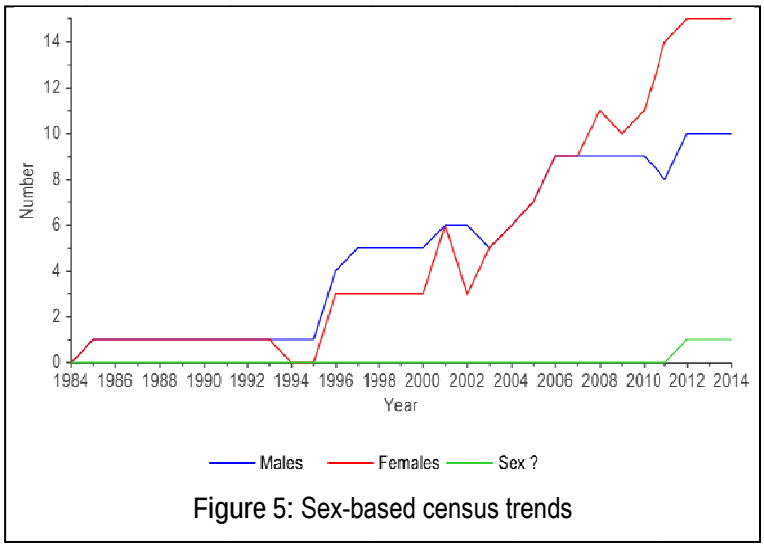


Figure 5: Sex-based census trends

sex-ratio in the captive population of wild-born individuals is male biased (1.3:1), while that for captive-born individuals is female biased (0.56:1) (Table 3).

Table 3: Summary of historical population

	Males	Females	Unknown	Total
Total studbook size	23	27	3	53
Total number of acquisitions from wild	13	10	0	23
Total number of births	9	16	3	28
Total number of unknown-origin individuals	1	1	0	2
Total number of deaths	13	8	2	23
Total number of breeding individuals	3	8	0	11
Wild-born that have bred	3	4	0	7
Captive-born that have bred	0	4	0	4

Breeding population

Figure 6 shows the proportion of the breeding population to the total captive population since inception. A total of 11 (3.8) individuals contributed to the 28 births in captivity, with reproductive activity in the activity remaining inconsistent over the years. The population includes 23 wild origin individuals; however only 7 (3.4) have reproduced in captivity. The reproductive contribution of females and males generation-wise is summarized as tables 4 and 5. Detailed analysis and interpretation of the tables is not presented as the small sample size makes the same redundant.

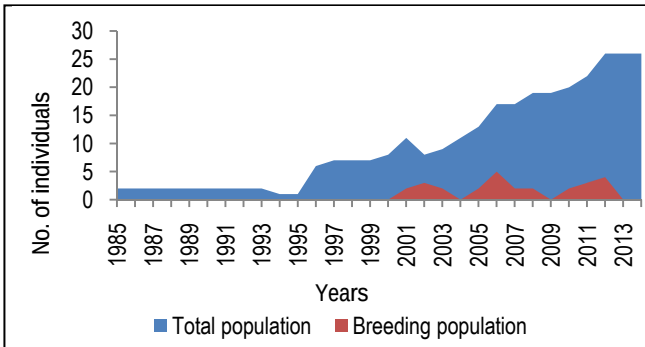


Figure 6: Breeding population

Table 4: Reproductive output per generation per female

Generation	No. of females	No. of reproducing females	No. of offspring	No. of surviving offspring	No. of offspring per female	No. of offspring per reproducing female	No. of surviving offspring per reproducing female
0	9	4	13	6	1.3	3.25	1.5
1	6	3	3	1	0.5	1	0.33
1.5	10	1	1	1	0.1	1	1

Table 5: Reproductive output per generation per male

Generation	No. of males	No. of reproducing males	No. of offspring	No. of surviving offspring	No. of offspring per male	No. of offspring per reproducing male	No. of surviving offspring per reproducing male
0	13	3	28	19	2	9.33	6.33
1	5	0	0	0	0	0	0
1.5	4	0	0	0	0	0	0

Living population

The living population includes 26 individuals (10. 15. 1) housed in six zoos. It comprises of nine wild-born (5.4.0), 3 of these (1.2.0) are housed as unpaired animals in Aizawl, Gangtok and Shillong and 17 captive-born individuals (5.11.1). The details of the living population are summarized in table 6.

Table 6: Summary of living population

	Males	Females	Unknown	Total
Total no. of living individuals	10	15	1	26
Total number of wild-born individuals	5	4	0	9
Total number of captive-born individuals	5	11	1	17
Total number of breeding individuals	2	5	0	7
Reproductively active wild-born	2	1	0	3
Reproductively active Captive-born	0	4	0	4

Age distribution

The age structure of the population is indicated in Figure 7. Overall, the age-structure depicts a relatively young population with a bias towards females. The living population consists of 6 individuals above the usual breeding age (≥ 10 years), 17 individuals between ages 3 -9 years and three sub-adults (0-2 years). The wild-born population consists of five reproductively active animals in the age class 3-9 years and four animals above 15 years of age.

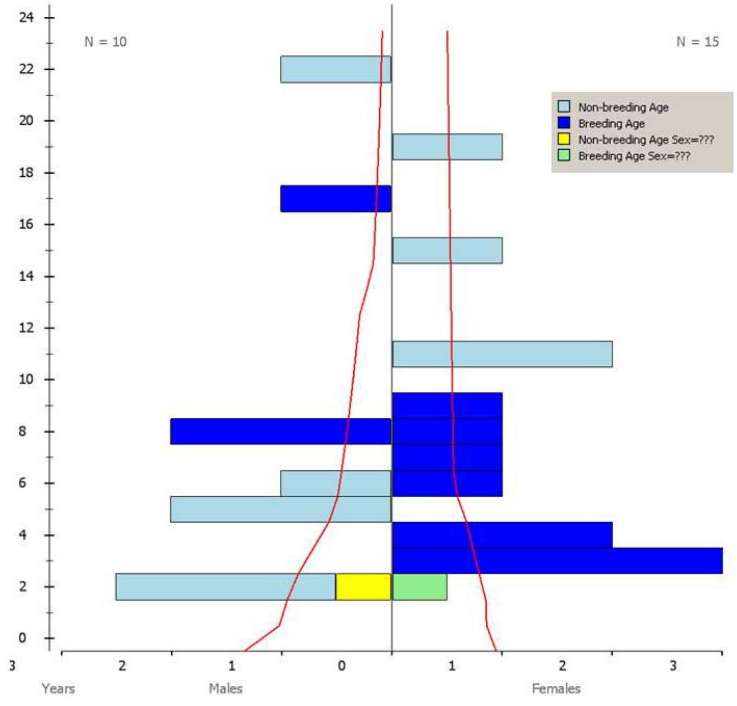


Figure 7: Age structure of the Clouded leopard population

* Unknown sex individuals have been considered 0.5 of each sex

The captive-born population consists of a large proportion of individuals that have recently attained sexual maturity (at 2-3 years of age). Although the age structure reflects a young, increasing population (r = 0.037; Table 8) with a large proportion of individuals in the reproductive-age class the problem lies in the fact that most of the reproductively active individuals have never bred. Only seven individuals have bred successfully in the past and five of these are in the older age-classes while only two individuals are in the reproductive age-class. The 17 individuals that are reproductively active represent 65% of the captive population, with 29% {5 (3.2)} of these being wild-born animals.

Births

The first birth in the Clouded leopard population took place in 2001. Since then a total of 28 (9.16.3) cubs were born in15 litters at Sepahijala Zoological Park (Figure 8). These births were contributed by 11 breeding pairs (composed of 3 males and 8 females) that produced a mean of 1.4 litters/ breeding pair, comprising 1.9 cubs/ litter. During 2001-2014 the mean litter size per year was 1.4 (range 1–3). The slow birth rate in captivity is reflected by the mean value of <1 birth per year. Of the 28 cubs born, five (1.2.2) died under 1 month of age, which represents 17.8% infant mortality. Two (1.1.0) cubs died between one month and six months of age and total cub deaths less than one year of age were 9 (3.4.2), which represents a 32.14% cub mortality rate. The median age of the captive-born individuals was 6.22 years ($6.06_{Mean} \pm 3.09_{SD}$) and the sex ratio at birth was 0.56:1.

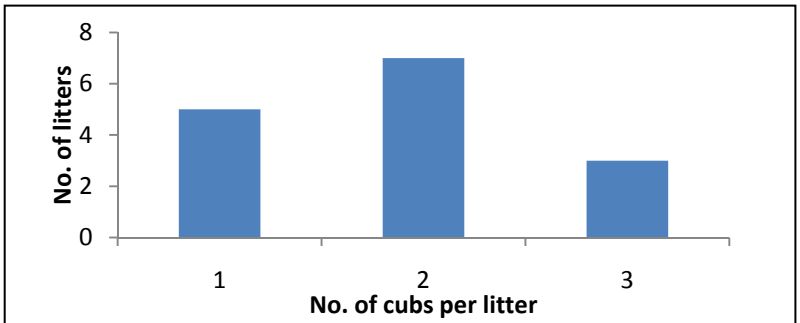


Figure 8 Litter size in the captive Clouded leopard population

Analysis of breeding records showed a pronounced breeding season in captivity. It can be seen from the graph (Figure 9) that births did not occur from September to January and that most births took place in March (68%). The results were similar to the 145 parturitions recorded in the Northern hemisphere with most births occurring in March (27.6) and April (18.6), however births were also recorded in 9 other months of the year (Wildt *et al.* 1986).

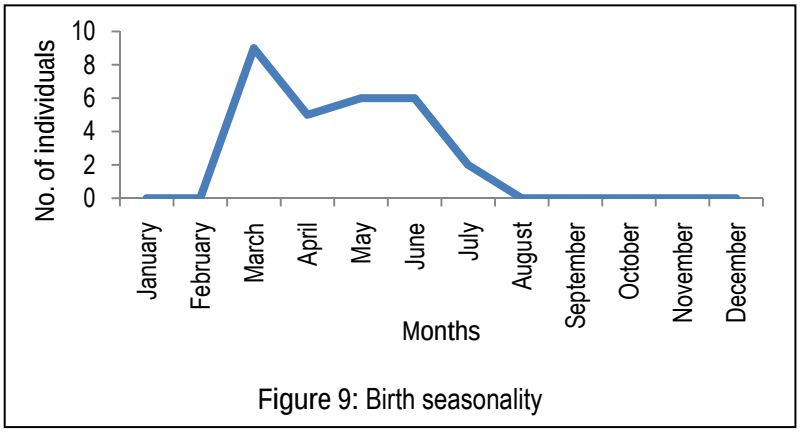


Figure 9: Birth seasonality

Life-tables

The life tables for the Clouded leopard captive population have been calculated from a total population of 53 specimens only with 0-16 individuals in each age-class for females and 0-10 individuals in each class for males. The small sample size across age classes limits the accuracy of calculations (see box below) therefore the results presented may be viewed only as an indicator.

Table 7: Life-table of the Clouded leopard captive population

Age (years)	Mx		Qx	
	Male	Female	Male	Female
0	0	0	0.32	0.16
1	0	0	0	0
2	0	0.222	0	0
3	0	0.089	0.07	0.14
4	0	0.128	0.14	0
5	0	0.311	0.14	0.15
6	0	0.346	0	0.08
7	0.5	0	0	0
8	0.933	0.141	0	0
9	0	0.329	0	0
10	0.333	0	0	0
11	0.167	0	0	0
12	0.5	0	0	0
13	0.833	0	0	0
14	0.5	0	0.33	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	1.5	0	0	0
19	0.5	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0

The vital rates (mortality, *Qx*; fecundity, *Mx*; and other related rates) for each age class are separately tabulated in the form a life-table. These provide an understanding of demographic characteristics of the population. These vital rates are age-specific tallies of birth and death events calculated using data from the studbook.

Life tables require large number of individuals in each age-class (at least 30 individuals) to produce accurate results (Traylor-Holzer 2011). Since age-specific fecundity and mortality rates for the species were based on samples of less than 20 individuals in each age-class the reproductive and mortality peaks generated by PMx using life-tables could be an artefact of the small sample sizes. The reproductive and mortality patterns were therefore analyzed manually to provide the actual characteristics of the population.

Reproductive patterns

The age at first reproduction was known for seven of the eight breeding females, the median age of first reproduction was at 3.07 (3.94±1.71) years and breeding continued until 9.09 years (Figure 10). Only two females have bred more than once and the birth interval ranged between

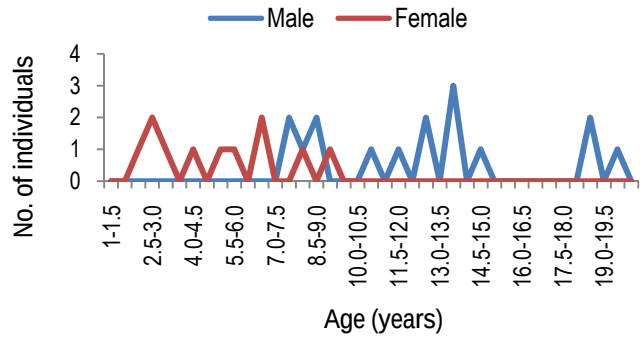


Figure 10: Age at reproduction of captive Clouded leopards

11-25 months. The majority of successful breeding was recorded at ages 5-7 years (5 births) for females. All the three males reproduced for the first time at more than seven years of age and breeding was recorded until the age of 20 years. The males reproduced at 7.5-9 years and at 13-14 years of age.

Mortality patterns

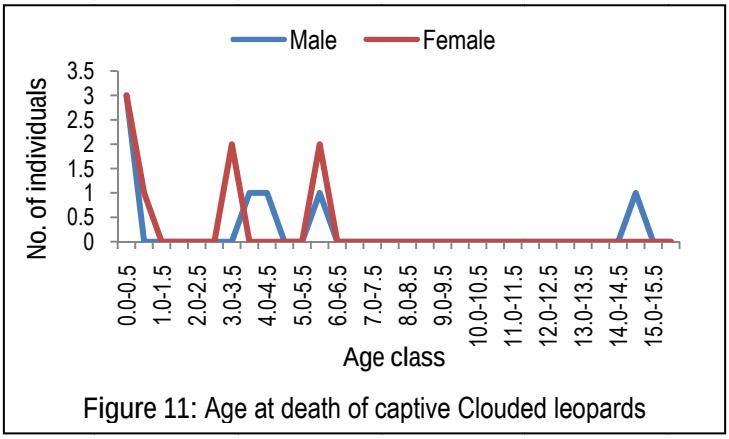


Figure 11: Age at death of captive Clouded leopards

A total of 23 (13.8.2) mortalities have been recorded since 1985, with a mean annual death rate of 7.63%. Figure 11 shows the age at death of Clouded leopards by sex. Birth date estimates were available for 16 (7.7.2) individuals. Of the known age animals that died, 50% were under 1 year old, 43.75% were within the breeding age group (≥3≤10 years of age) and 6.25% or 1 was over 10 years of age. The mean annual mortality rate (Figure 5) was high during 2002-2003 and 2009-2010 which led to a decline in population size during these years.

Population growth rate and projections

Table 8: Life-table summary

	Male	Female	Total
Instantaneous rate of change (r)	0.071	0.003	0.037
Population growth rate (λ)	1.074	1.003	1.037
Mean generation time (T)	11.5	5.4	8.4
Current N	10	15	25
N at 20 years	16	23	39

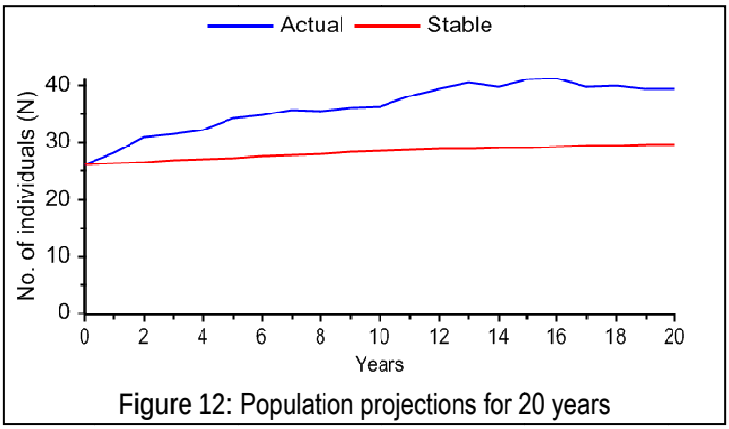


Figure 12: Population projections for 20 years

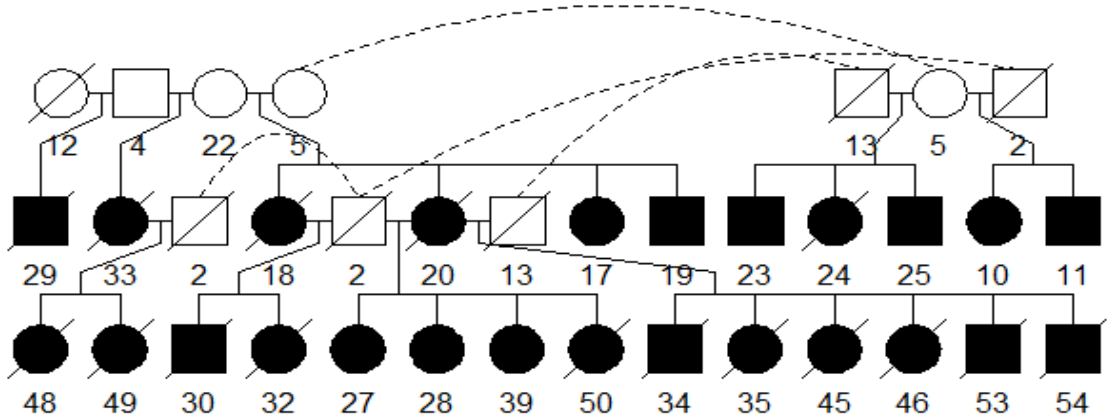
The population shows a total growth rate (λ) of 1.037. However, the various rates of population growth calculated need to be viewed with caution as the population from 1985 – 2001 grew due to inclusion of wild origin animals and not due to captive births. The mean generation time calculated from life tables for males (11.5 years) was found to be double of that for females (5.4 years). This can be attributed to the small number of breeding males in the population (n = 3) and the late age of onset of reproduction (7 years) (Figure 10).

Population projections for the next 20 years (Figure 12) carried out using PMx suggest that the population with its current recruitment (birth) and mortality rates would increase from its current size of 26 to only 39 individuals over the next 20 years. The projected population size is inadequate for retaining the desired 90% level of genetic diversity sampled from wild origin individuals.

GENETIC ANALYSIS

Historical population

The clouded leopard captive population includes 23 (13.10) wild origin animals; however only seven (3.4) have reproduced, ten (7.3) specimens have passed on without contributions while six (3.3) animals can potentially contribute to the captive population. The lineage of the captive population is presented as Figure 13.



Legend

Females are represented by circles
Males by squares
Living animals by strikethrough
The number outside the symbol represents the National studbook number
Solid fills represent captive-born individuals and no fill is wild-born individual

Figure 13: Pedigree chart of the Clouded leopard population in Indian zoos.

The figure shows the relationship of 25 individuals in captivity; six wild-born individuals (3.3) that have living descendants in the current population and 25 captive-born individuals (9.16) of known lineage and sex. Wild-born individuals that have not bred (10.6) or do not have descendants {(0.1); (Studbook no. 00006)} in the living population have not been represented in the figure. Individuals of unknown sex (00014, 00015 and 00052) and unknown origin (00037 and 00038) have also been excluded from the pedigree chart.

Living population

Six founder animals are represented in the population that has retained 85.12% of its genetic diversity with no inbreeding. The 3 living founders are more than 15 years of age and will soon reach reproductive senescence. Of the 6 potential founders, ages of 3 individuals are not known, 2 are in the reproductively active age-classes and 1 is reproductively senescent. Inbreeding has been avoided by mating between either only wild-born (F_0) or between wild-born and captive-born individuals (F_1) (Figure 13). However, the small population size including only a few successful breeders results in limited mating choices available. This has resulted in a high mean kinship value (table 9) indicating a loss of genetic diversity. The genetic status of the living population is summarized in Table 9.

Table 9: Genetic summary of the captive Clouded leopard population

	Current	Potential
Founders	6	6
Gene Diversity	0.8512	0.9558
Population Mean Kinship	0.1488	
Founder Genome Equivalents	3.36	11.32

Founder representation

Six wild origin animals have contributed to the gene-pool of the captive population (numbers 00002, 00004, 00005, 00012, 00013 and 00022) (Figure 14), of which three (00002, 00012, 00013) are alive. Representation of founder contributions in the current population is unequal. A large proportion of the living descendants have originated from four founders (numbers 00002, 00004, 00005, 00013) while founder numbers 00012 (living) and 00022 (dead), have only one and three descendants, respectively, in the living population.

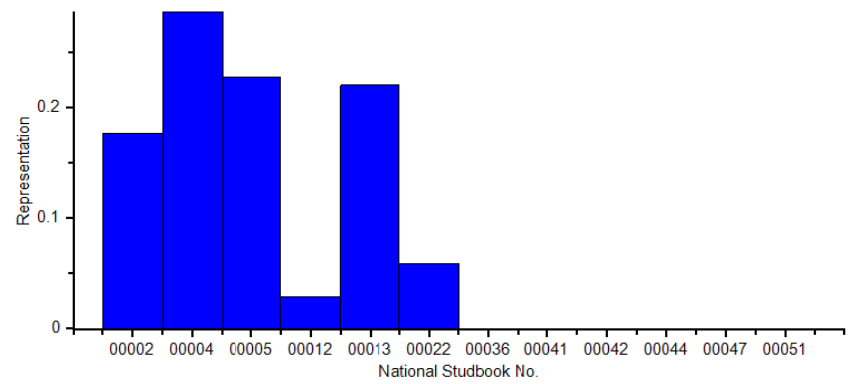


Figure 14: Founder representation

Founder genome equivalents

It is the number of unrelated founders that would represent the same amount of gene diversity as does the population of currently living individuals. For the captive clouded leopard population the current value of FGE = 3.36. This signifies that population retains the gene diversity that would be brought in by 3.36 founders. An equitable representation of the potential founders can significantly change the current value of FGE to 11.32

Gene diversity retained

The population has retained a genetic diversity of 0.8512 or 85% of the sampled genetic diversity from six wild origin founders. The population is thereby vulnerable to stochastic events as this value is much lower than the desired 90% sampled from 20 unrelated founders. During the course of the species history in captivity from 1985 to 2001 no genetic diversity was retained in the population as no reproductive activity occurred in the captive population. Since 2003 the genetic diversity has increased due to breeding in captivity and has now stabilized at 85%.

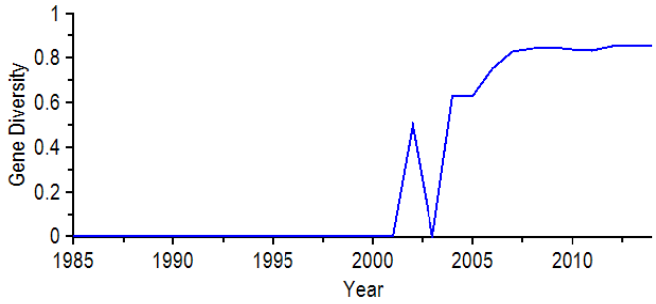


Figure 15: Gene diversity retained over time

Population mean kinship

Mean kinship (MK) is a measure for assessing the relatedness of an individual to all other individuals in the population. Individuals with mean kinship value of zero have no living relatives in the population. They are either wild-caught or single descendants from founders and are therefore more genetically valuable in a breeding programme. The mean kinship of the Clouded leopard population is 0.1488 (ranging from 0 to 0.1985) indicating that individuals in the population are closely related to each other. The mean kinship values of the living individuals in the population are summarized in table 10.

Table 10: Mean kinship (MK) values in the captive Clouded leopard population

National Studbook #	Location	Sex	Age (years)	MK	National Studbook #	Location	Sex	Age (years)	MK
00002	Sepahijala	Male	22	0.0882	00012	Itanagar	Female	15	0.0147
00013	Sepahijala	Male	17	0.1103	00018	Sepahijala	Female	11	0.1581
00029	Sepahijala	Male	8	0.0938	00020	Sepahijala	Female	11	0.1985
00030	Darjeeling	Male	8	0.1379	00024	Darjeeling	Female	9	0.1268
00034	Sepahijala	Male	6	0.1691	00032	Sepahijala	Female	8	0.1379
00042	Itanagar	Male	5	0	00033	Sepahijala	Female	7	0.1158
00044	Sepahijala	Male	5	0	00035	Itanagar	Female	6	0.1691
00047	Gangtok	Male	--	0	00036	Aizawl	Female	--	0
00053	Sepahijala	Male	2	0.1691	00041	Sepahijala	Female	19	0
00054	Sepahijala	Male	2	0.1691	00045	Sepahijala	Female	4	0.1691
					00046	Sepahijala	Female	4	0.1765
					00048	Sepahijala	Female	3	0.1167
					00049	Sepahijala	Female	3	0.1167
					00050	Sepahijala	Female	3	0.1581
					00051	Shillong	Female	--	0

Targets for population management

The present captive population of Clouded leopards in Indian zoos comprises of 26 (10.15.1) individuals with only seven (2.5) reproductively active animals. The population retains 85% of the genetic diversity from six founders. The population is yet to attain stability and includes a large proportion of individuals that are reproductively inactive.

Ensuring long term survival of a species in captivity requires an understanding of the population size to be maintained in captivity over time and supplementation by wild origin animals to compensate for loss of genetic diversity. Simulations using PMx (Ballou et. al. 2011) were used to determine the population size needed to be maintained in captivity and the supplementation with wild origin animals required to maintain the genetic diversity of the population. The simulation was run using several scenarios the outcomes of two scenarios are presented here.

Scenario 1

This scenario was run using the current population in captivity and provides an indicator to the changes in genetic and demographic status of the population over the next 100 years. The input variables are summarized in table 11 below and the outcomes of the simulation are presented as figure 16. It indicates that the population can achieve the target population size of 100 individuals after 35 – 40 years; however it would be unable to retain the desired 90% genetic diversity after 100 years.

Simulation Output

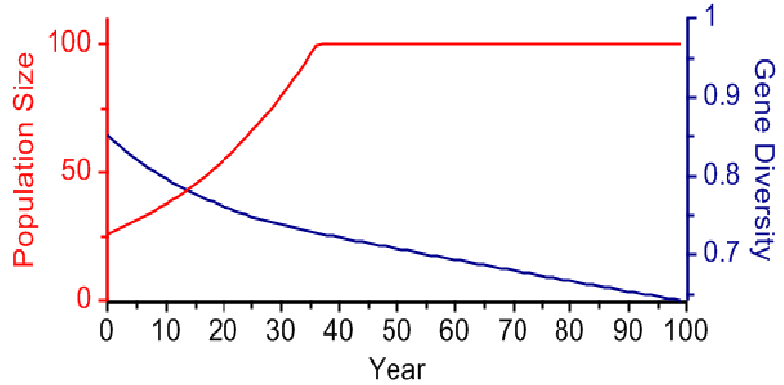


Figure 16: Simulation outcomes without supplementation

Table 11: Input variables

Population Variables:

- Generation Length; 8.4
- Maximum potential lambda; 1.0375
- Current N; 26
- Current Ne; 7.8
- Ne/N; 0.30
- Current Gene Diversity; 0.8512
- Maximum N; 100
- No founders added

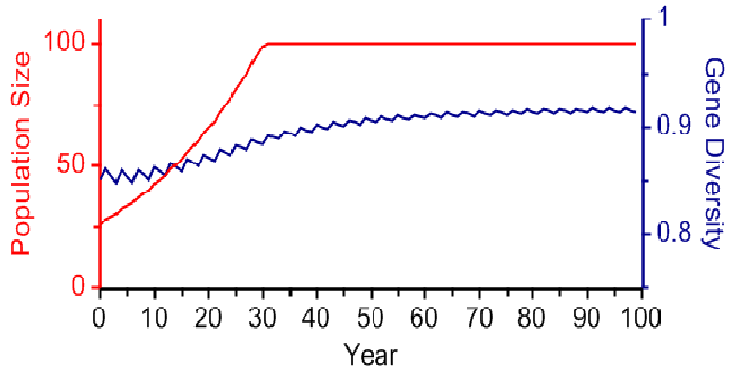
Results:

- Goal not possible - Can maintain only 63.9%.

Scenario 2:

The simulation was run using various supplementation options and the one that best allowed the achieving of both demographic and genetic goals of the population involved increasing the maximum population size to 100 individuals and supplementation of the population with 1 effective founder every

three years over the next 100 years (Figure 17). Running this simulation resulted in achieving the population goals. The suggested intervention can ensure the retaining of 91.7% genetic diversity sampled for establishing it over the next 100 years.

Simulation Output	Table 12: Input variables
 Figure 17: Simulation outcomes with supplementation	Population Variables: Generation Length; 8.4 Maximum potential lambda; 1.0375 Current N; 26 Current Ne; 7.8 Ne/N; 0.30 Current Gene Diversity; 0.8512 Maximum N; 100 Founder Related Variables New founders per Addition event; 1 Year to start adding founders; 0 Years between events; 3 Year to stop adding founders; 100 FGE per Founder; 0.40 N per Founder; 1 Results: Can exceed goals and maintain 91.7% Can maintain over 90.0% for up to 109 years

Breeding Recommendations

The objective of maintaining populations of threatened species in captivity is to ensure their long term survival. This is achieved by maintaining demographically stable and genetically viable populations. However; the Clouded leopard population in Indian zoos does not fulfil this objective. Maintaining a demographic stable population is crucial towards ensuring its long term survival. The genetic concerns of the population can be addressed at a later stage after achieving the desired population size. The pairing choices listed in table 13 below address this need of the population. The pairing choices are based on “Mate Suitability Index’ (MSI), details of the same are presented in table 11. The mating choices suggested also include pairings with MSI scores of five and six, although undesirable as these results in lowering the genetic diversity of the population. This has been done keeping in view the mate compatibility issues that have reduced the reproductive potential of the population.

Table 113: Pairing options for the captive Clouded leopard population

Dam ID	Possible Sires	MSI	Mate Suitability Index (MSI)
00018	00002, 00013	3	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. These variables are combined using a default set of definitions (that can be modified on the genetic Settings tab) to assign a *MSI* score of 1 to 6 for each pair, which can be thought of as follows: 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 explore options for pairing individuals at one facility that houses numerous individuals of each sex or to identify an alternative suitable mate if a recommended breeding fails. Source: Traylor-Holzer, K. (ed.). 2011.
	00042, 00044, 00047	6	
00020	00002	4	
	00013	5	
	00042, 00044, 00047	6	
00024	00002, 00029	3	
	00042, 00044, 00047	4	
00012	00042, 00044, 00047	1	
	00002	3	
	00013, 00030	4	
	00034, 00053, 00054	6	
00032	00013	2	
	00029, 00034,	6	
	00042, 00044, 00047	6	
	00053, 00054	6	
00033	00002, 00013	2	
	00042, 00044, 00047	4	
	00030, 00034, 00053, 00054	6	
00035	00002	3	
	00029, 00030	6	
	00042, 00044, 00047	6	
00036	00042, 00044, 00047	1	
	00002	2	
	00013, 00029	4	
	00030, 00034, 00053, 00054	6	
00041	00042, 00044, 00047	1	
	00002	2	
	00013, 00029	4	
	00030	6	
	00034, 00053, 00054	6	
00045	00002	3	
	00029, 00030	6	
	00042, 00044, 00047	6	
00046	00002	3	
	00029, 00030	6	
	00042, 00044, 00047	6	
00048	00013	2	
	00034	4	
	00042, 00044, 00047	4	
	00053, 00054	4	
	00029	6	
00049	00013	2	
	00034	4	
	00042, 00044, 00047	4	
	00053, 00054	4	
	00029	6	
00050	00013	3	
	00029	6	
	00042, 00044, 00047	6	
00051	00042, 00044, 00047	1	
	00002	2	
	00013, 00029	4	
	00030, 00034, 00053, 00054	6	

Conclusions

The current captive population of clouded leopards in Indian zoos totals 26 specimens (10.15.1) housed at six locations. The population presently has an intrinsic growth rate of 1.037 and a mean generation time of 8.4 years. The present population includes seven (2.5) reproductively active individuals. Of the nine (5.4) founder animals included in the population, three (2.1) animals are in the reproductively active age classes.

The population retains approximately 85% of the genetic diversity brought in by six founders. The current population has no inbreeding; however the population mean kinship (0.1488) shows that the population contains a low level of genetic diversity also indicated by the low value of founder genome equivalents (3.36). Simulations to assess the demographic stability and genetic viability of the population suggest that inclusion of one effective founder every third year and achieving a population size of 100 individuals will ensure the long term survival of this population.

Analysis of the pedigree database shows:

1. The population has a poor growth rate with few individuals in the breeding pool resulting in its failure in achieving the demographic and genetic targets for maintaining a stable the population.
2. The presence six potential founders suggest that with suitable interventions the population can achieve its targets.

The limited breeding success of individuals suggests that the housing and husbandry practices followed need to be reviewed and modified. Holding institutions also need to address the incompatibility issues (also mentioned in literature) that can lower the reproductive potential of the species in captivity. Acquisition of new founders should be initiated only after addressing the housing, husbandry and incompatibility issues.

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Appendix I

Historical Population *Neofelis nebulosa*

Sl. No.	National Studbook No. Local ID Transponder No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
1	00001	Badal 0006B7391D	M	????	Wild	Wild	India Assam	01-Jul-92 01-Jul-92 03-Sep-10	Capture Transfer Death
2	00002	Nandan CLO-1 0006B73987	M	~ 1992	Wild	Wild	India Sepahijala	10-Feb-96 10-Feb-96	Capture Transfer
3	00003	Raja	M	????	Wild	Wild	India Patna	26-Jul-96 26-Jul-96 08-Sep-03	Capture Transfer Death
4	00004	Taju CLO-2 0006B7E31B	M	~ 1994	Wild	Wild	India Sepahijala	25-Nov-97 26-Nov-97 03-Apr-09	Capture Transfer Death
5	00005	Shilpi CLO-3	F	????	Wild	Wild	India Sepahijala	09-Jun-00 09-Jun-00 30-Jul-06	Capture Transfer Death
6	00006	Ritul CLO-4	F	~ 1996	Wild	Wild	India Sepahijala	20-Aug-96 20-Aug-96 04-Mar-02	Capture Transfer Death
7	00007	Mantu CLO-5	M	~ 1997	Wild	Wild	India Sepahijala India	30-Oct-00 30-Oct-00 ????	Capture Transfer Release

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
8	00008	Alam CLO-6	M	15-May-96	Wild	Wild	India Sepahijala	15-May-96 15-May-96 28-Mar-02	Capture Transfer Death
9	00009	Sumita CLO-11	F	16-May-96	Wild	Wild	India Sepahijala	16-May-96 16-May-96 01-Apr-02	Capture Transfer Death
10	00010	Minu CLO-8	F	13-Jun-01	00002	00005	Sepahijala	13-Jun-01 05-Apr-02	Birth Death
11	00011	Khaled CLO-7	M	13-Jun-01	00002	00005	Sepahijala	13-Jun-01 01-Jul-01	Birth Death
12	00012	Deshi CLO-9 0006B8AC34	F	~ 1999	Wild	Wild	India Sepahijala Itanagar	16-Jul-01 16-Jul-01 20-Sep-12	Capture Transfer Transfer
13	00013	Ghaura CLO-10 0006B7F07E	M	~ 1997	Wild	Wild	India Sepahijala	23-Jul-01 23-Jul-01	Capture Transfer
14	00014	Unnamed CLO-12	?	01-Mar-02	00004	00006	Sepahijala	01-Mar-02 01-Mar-02	Birth Death
15	00015	Unnamed CLO-13	?	01-Mar-02	00004	00006	Sepahijala	01-Mar-02 01-Mar-02	Birth Death
16	00016	Raja 0006B71CE9	M	????	Wild	Wild	India Assam	04-Mar-02 04-Mar-02 18-Oct-10	Capture Transfer Death
17	00017	Supriya CLO-14	F	19-Jul-02	00004	00005	Sepahijala	19-Jul-02 29-Aug-02	Birth Death

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
18	00018	Rehana CLO-16 0006B8A0B6	F	04-May-03	00004	00005	Sepahijala	04-May-03	Birth
19	00019	Subash CLO-17	M	04-May-03	00004	00005	Sepahijala	04-May-03 30-Jul-03	Birth Death
20	00020	Reshmi CLO-15 0006B887B1	F	04-May-03	00004	00005	Sepahijala	04-May-03	Birth
21	00021	Siddik CLO-18 0006B8AEFC	M	23-Mar-04	Wild	Wild	India Sepahijala	23-Mar-04 23-Mar-04 29-Feb-08	Capture Transfer Death
22	00022	Rani CLO-19	F	~ Apr 2004	Wild	Wild	India Sepahijala	24-Apr-04 25-Apr-04 22-Sep-07	Capture Transfer Death
23	00023	Asoke CLO-20	M	27-Mar-05	00013	00005	Sepahijala	27-Mar-05 23-Sep-05	Birth Death
24	00024	Priti CLO-21 0006B886CO	F	27-Mar-05	00013	00005	Sepahijala Darjeeling	27-Mar-05 27-Mar-09	Birth Transfer
25	00025	Zimmi CLO-22 0006B883AC	M	27-Mar-05	00013	00005	Sepahijala	27-Mar-05 04-Apr-09	Birth Death
26	00027	Pallabi CLO-24 0006B8952A	F	24-Apr-06	00002	00020	Sepahijala	24-Apr-06 06-Jul-09	Birth Death

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
27	00028	Sanjit CLO-23 0006B7F06A	F	24-Apr-06	00002	00020	Sepahijala	24-Apr-06	Birth LTF
28	00029	Rahul CLO-25 0006B899A8	M	13-May-06	00004	00012	Sepahijala	13-May-06	Birth
29	00030	Nibash CLO-26 28002 0006B88A82	M	29-May-06	00002	00018	Sepahijala Darjeeling	29-May-06 27-Mar-09	Birth Transfer
30	00032	Parul CLO-27 0006B88836	F	29-May-06	00002	00018	Sepahijala	29-May-06	Birth
31	00033	Pratibha CLO-28 0006B73COD	F	19-Mar-07	00004	00022	Sepahijala	19-Mar-07	Birth
32	00034	Manmohan CLO-29 000647B34D	M	21-Jun-08	00013	00020	Sepahijala	21-Jun-08	Birth
33	00035	Mayabati CLO-30 000647C7D9	F	21-Jun-08	00013	00020	Sepahijala Itanagar	21-Jun-08 20-Sep-12	Birth Transfer
34	00036	Tei	F	????	Wild	Wild	India Aizawl	16-Jul-06 18-Jul-06	Capture Transfer
	00037	Unnamed	M	????	Unk	Unk	India	????	Birth

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
35							Ahmedabad	04-Apr-85 14-Apr-92	Transfer Death
36	00038	Unnamed	F	????	Unk	Unk	India Ahmedabad Kanpur	???? 04-Apr-85 ~ 1994	Birth Transfer LTF
37	00039	Meera Kumari CLO-23	F	24-Apr-06	00002	00020	Sepahijala	24-Apr-06	Birth LTF
38	00040	Rani	F	????	Wild	Wild	India Dimapur	~ Jul 2008 ~ Jul 2008 23-Dec-10	Capture Transfer Death
39	00041	Megh 00064F38D0	F	~ 1995	Wild	Wild	India Itanagar Darjeeling Sepahijala	???? ???? 22-Nov-01 18-Mar-09	Capture Transfer Transfer Transfer
40	00042	Kalu	M	~ Mar 2009	Wild	Wild	India Itanagar	04-Apr-09 04-Apr-09	Capture Transfer
41	00043	Fioder	M	????	Wild	Wild	India Dimapur	16-Apr-09 16-Apr-09 21-Mar-11	Capture Transfer Death
42	00044	Prasanta	M	~ 2009	Wild	Wild	India Sepahijala	25-Aug-10 25-Aug-10	Capture Transfer
43	00045	Sriti	F	14-Mar-10	00013	00020	Sepahijala	14-Mar-10	Birth
44	00046	Shathi	F	14-Mar-10	00013	00020	Sepahijala	14-Mar-10	Birth
45	00047	Khamsung	M	????	Wild	Wild	India Gangtok	02-Nov-10 02-Nov-10	Capture Transfer

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
46	00048	Lily 0006590805	F	14-Apr-11	00002	00033	Sepahijala	14-Apr-11	Birth
47	00049	Joy/Jui 000647D94C	F	14-Apr-11	00002	00033	Sepahijala	14-Apr-11	Birth
48	00050	Jiten/July	F	01-Jul-11	00002	00020	Sepahijala	01-Jul-11	Birth
		0006584EBA							
49	00051	Unnamed 165	F	????	Wild	Wild	India Shillong	18-Jan-12 19-Jan-12	Capture Transfer
50	00052	Unnamed	?	19-Mar-12	00002	00046	Sepahijala	19-Mar-12	Birth
51	00053	Mangal 0006586218	M	02-Jun-12	00013	00020	Sepahijala	02-Jun-12	Birth
52	00054	Abhi 00064F2626	M	02-Jun-12	00013	00020	Sepahijala	02-Jun-12	Birth
53	00055	Unnamed	F	????	Wild	Wild	India Darjeeling	21-Aug-96 21-Aug-96 18-Mar-00	Capture Transfer Death
TOTALS: 23.27.3 (53)									

Appendix II

Living Population *Neofelis nebulosa*

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
Aizawl Zoo, Aizawl									
1.	00036	Tei	F	????	Wild	Wild	India Aizawl	16-Jul-06 18-Jul-06	Capture Transfer
Totals: 0.1.0-1									
Biological Park, Itanagar									
2.	00012	Deshi CLO-9 0006B8AC34	F	~ 1999	Wild	Wild	India Sepahijala Itanagar	16-Jul-01 16-Jul-01 20-Sep-12	Capture Transfer Transfer
3.	00035	Mayabati CLO-30 000647C7D9	F	21-Jun-08	00013	00020	Sepahijala Itanagar	21-Jun-08 20-Sep-12	Birth Transfer
4.	00042	Kalu	M	~ Mar 2009	Wild	Wild	India Itanagar	04-Apr-09 04-Apr-09	Capture Transfer
Totals: 1.2.0-3									
Himalayan Zoological Park, Gangtok									
5.	00047	Khamsung	M	????	Wild	Wild	India Gangtok	02-Nov-10 02-Nov-10	Capture Transfer
Totals: 1.0.0-1									
Lady Hydari Animal Park Land, Shillong									
6.	00051	Unnamed	F	????	Wild	Wild	India	18-Jan-12	Capture
		165					Shillong	19-Jan-12	Transfer

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
Totals: 0.1.0-1									
Padmaja Naidu Himalayan Zoological Park, Darjeeling									
7.	00024	Priti CLO-21 0006B886CO	F	27-Mar-05	00013	00005	Sepahijala Darjeeling	27-Mar-05 27-Mar-09	Birth Transfer
8.	00030	Nibash CLO-26 28002 0006B88A82	M	29-May-06	00002	00018	Sepahijala Darjeeling	29-May-06 27-Mar-09	Birth Transfer
Totals: 1.1.0-2									
Sepahijala Zoological Park, Sepahijala									
9.	00002	Nandan CLO-1 0006B73987	M	~ 1992	Wild	Wild	India Sepahijala	10-Feb-96 10-Feb-96	Capture Transfer
10.	00013	Ghaura CLO-10 0006B7F07E	M	~ 1997	Wild	Wild	India Sepahijala	23-Jul-01 23-Jul-01	Capture Transfer
11.	00018	Rehana CLO-16 0006B8A0B6	F	04-May-03	00004	00005	Sepahijala	04-May-03	Birth
12.	00020	Reshmi CLO-15 0006B887B1	F	04-May-03	00004	00005	Sepahijala	04-May-03	Birth
13.	00029	Rahul CLO-25	M	13-May-06	00004	00012	Sepahijala	13-May-06	Birth

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
		0006B899A8							
14.	00032	Parul CLO-27 0006B88836	F	29-May-06	00002	00018	Sepahijala	29-May-06	Birth
15.	00033	Pratibha CLO-28 0006B73COD	F	19-Mar-07	00004	00022	Sepahijala	19-Mar-07	Birth
16.	00034	Manmohan CLO-29 000647B34D	M	21-Jun-08	00013	00020	Sepahijala	21-Jun-08	Birth
17.	00041	Megh 00064F38D0	F	~ 1995	Wild	Wild	India Itanagar Darjeeling Sepahijala	???? ???? 22-Nov-01 18-Mar-09	Capture Transfer Transfer Transfer
18.	00044	Prasanta	M	~ 2009	Wild	Wild	India Sepahijala	25-Aug-10 25-Aug-10	Capture Transfer
19.	00045	Sriti	F	14-Mar-10	00013	00020	Sepahijala	14-Mar-10	Birth
20.	00046	Shathi	F	14-Mar-10	00013	00020	Sepahijala	14-Mar-10	Birth
21.	00048	Lily 0006590805	F	14-Apr-11	00002	00033	Sepahijala	14-Apr-11	Birth
22.	00049	Joy/Jui 000647D94C	F	14-Apr-11	00002	00033	Sepahijala	14-Apr-11	Birth
23.	00050	Jiten/July	F	01-Jul-11	00002	00020	Sepahijala	01-Jul-11	Birth
		0006584EBA							
24.	00052	Unnamed	?	19-Mar-12	00002	00046	Sepahijala	19-Mar-12	Birth

Sl. No.	National Studbook No.	House name Local ID Transponder No.	Sex	Birth Date	Sire	Dam	Location	Date	Event
25.	00053	Mangal 0006586218	M	02-Jun-12	00013	00020	Sepahijala	02-Jun-12	Birth
26.	00054	Abhi 00064F2626	M	02-Jun-12	00013	00020	Sepahijala	02-Jun-12	Birth
Totals: 7.10.1- 18									
TOTALS: 10.15.1 (26)									
6 Institutions									

PEDIGREE CHART REPORT

```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00001
==========================================================================
                 WILD                                      WILD
                                \           /              Sex: Male
                                 \         /       Birth Date:    ????
                                  \     Last Location: ASSAM      (dead)
                                dam\     /sire     House Name: BADAL
                                    \   /              Tattoo:
                                     \ /             Tag/Band:
                                   00001

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                   Studbook Number:  00002
==========================================================================
                 WILD                                      WILD
                                \           /              Sex: Male
                                 \         /     Birth Date:      ~ 1992
                                  \       /    Last Location: SEPAHIJAL
                                dam\     /sire     House Name: nandan
                                    \   /              Tattoo:
                                     \ /             Tag/Band:
                                   00002


==========================================================================
Taxon Name: NEOFELIS NEBULOSA                   Studbook Number:  00003
==========================================================================
                 WILD                                      WILD
                                \           /              Sex: Male
                                 \         /       Birth Date:    ????
                                  \     Last Location: PATNA      (dead)
                                dam\     /sire     House Name:
                                    \   /              Tattoo:
                                     \ /             Tag/Band:
                                   00003

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                   Studbook Number:  00004
==========================================================================
                 WILD                                      WILD
                                \           /              Sex: Male
                                 \         /     Birth Date:      ~ 1994
                                  \     Last Location: SEPAHIJAL (dead)
                                dam\     /sire     House Name: TAJU
                                    \   /              Tattoo:
                                     \ /             Tag/Band:
                                   00004
```

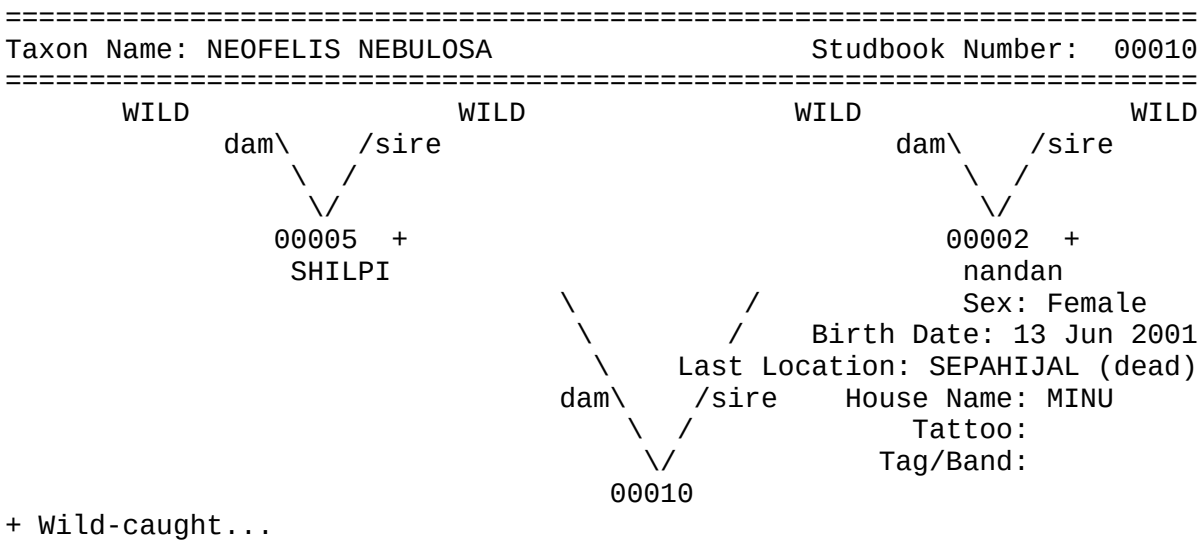
```
========================================================================
Taxon Name: NEOFELIS NEBULOSA              Studbook Number:  00005
========================================================================
                 WILD                                    WILD
                                 \          /            Sex: Female
                                  \        /      Birth Date:    ????
                                   \    Last Location: SEPAHIJAL (dead)
                                 dam\    /sire    House Name: SHILPI
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00005

========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00006
========================================================================
                 WILD                                    WILD
                                 \          /            Sex: Female
                                  \        /    Birth Date:      ~ 1996
                                   \    Last Location: SEPAHIJAL (dead)
                                 dam\    /sire    House Name: RITUL
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00006

========================================================================
Taxon Name: NEOFELIS NEBULOSA                Studbook Number:  00007
========================================================================
                 WILD                                    WILD
                                 \          /            Sex: Male
                                  \        /   Birth Date:      ~ 1997
                                   \      /    Last Location: INDIA
                                 dam\    /sire    House Name: MANTU
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00007

========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00008
========================================================================
                 WILD                                    WILD
                                 \          /            Sex: Male
                                  \        /   Birth Date: 15 May 1996
                                   \    Last Location: SEPAHIJAL (dead)
                                 dam\    /sire    House Name: ALAM
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00008

========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00009
========================================================================
                 WILD                                    WILD
                                 \          /            Sex: Female
                                  \        /    Birth Date: 16 May 1996
                                   \    Last Location: SEPAHIJAL (dead)
                                 dam\    /sire    House Name: SUMITA
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00009
```



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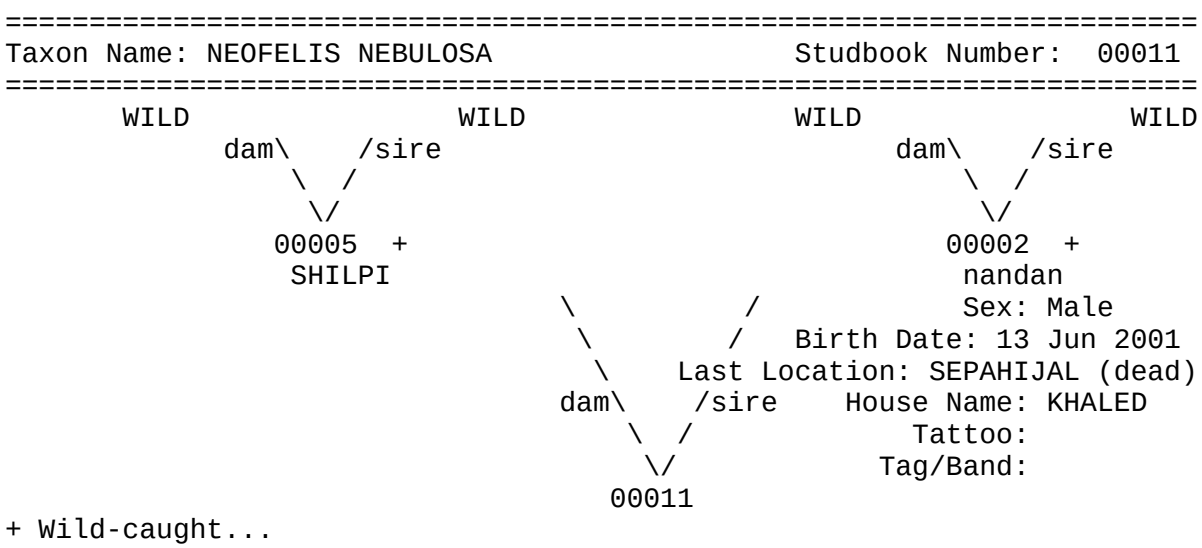
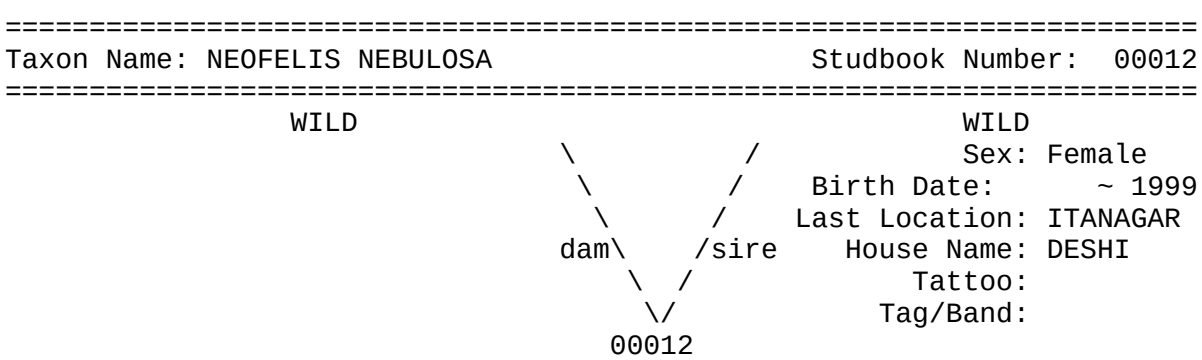
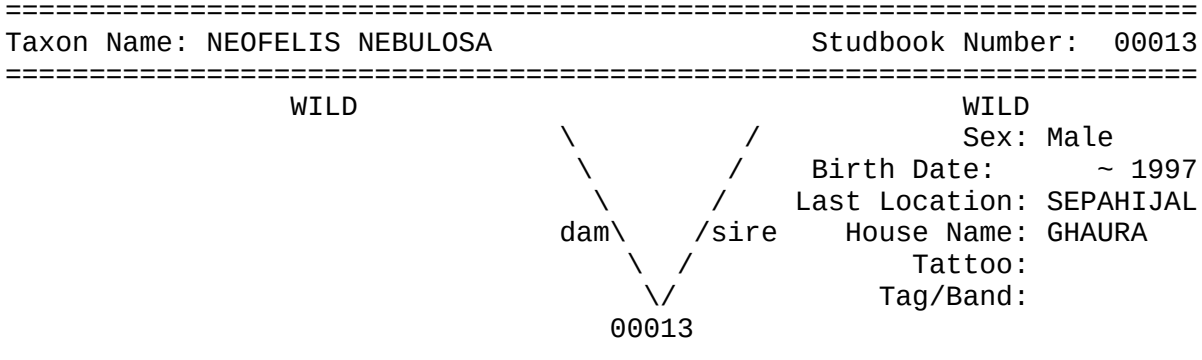


+ Wild-caught...



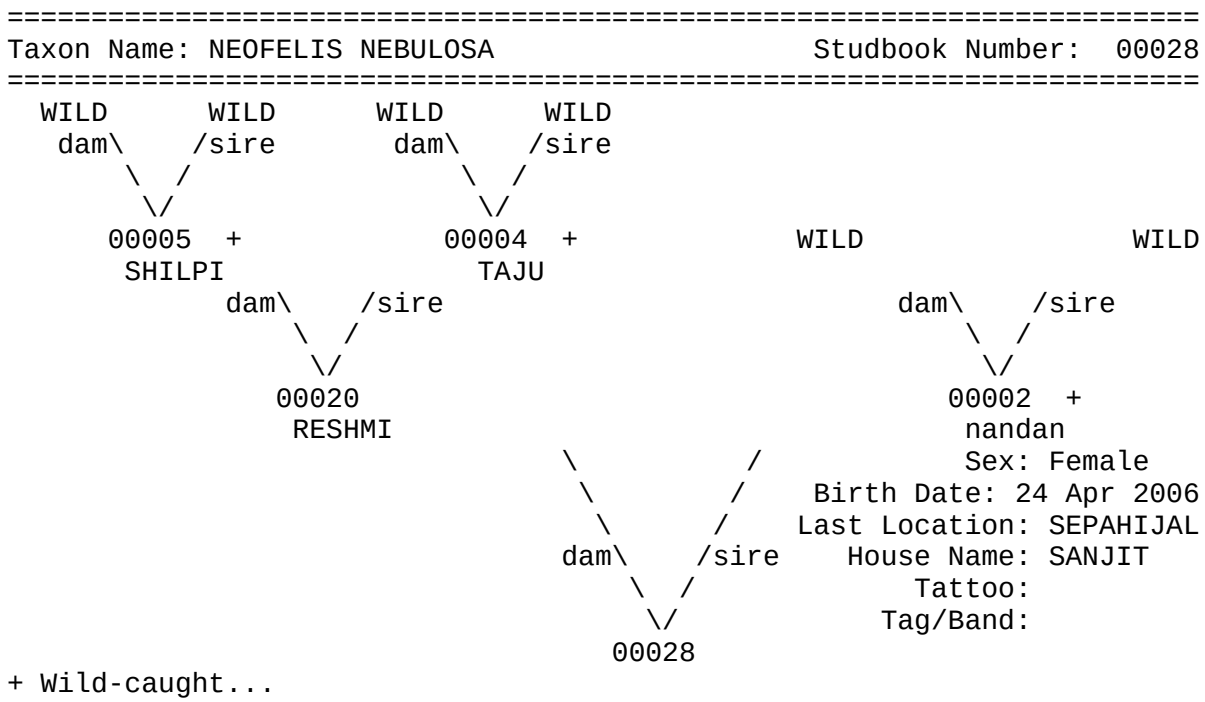


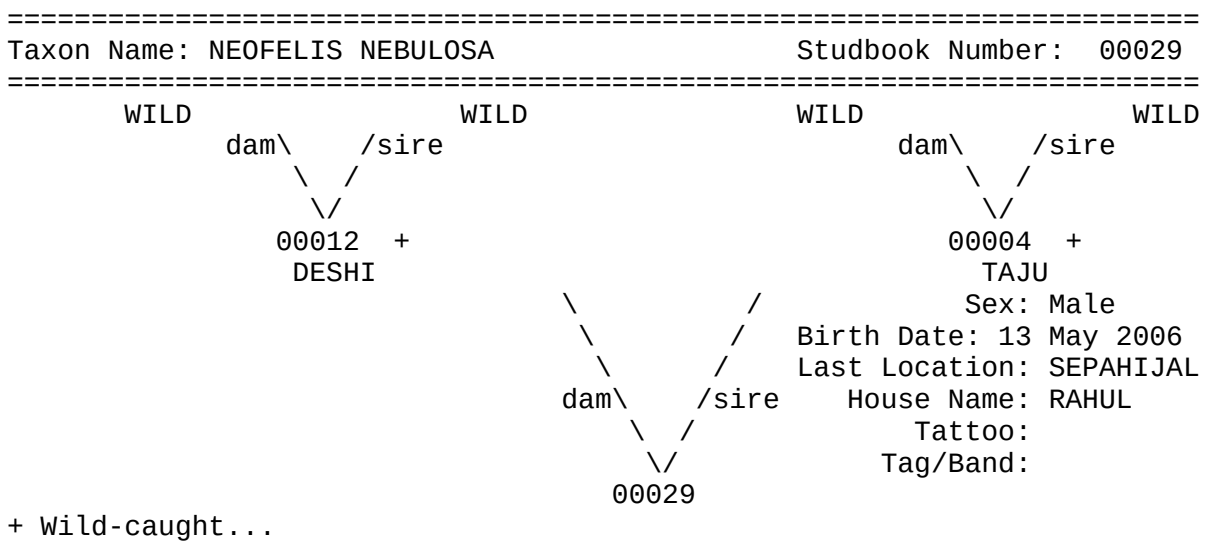
```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00014
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
                00006  +                            00004  +
                 RITUL                               TAJU
                                  \          /       Sex: Unknown
                                   \        /    Birth Date:  1 Mar 2002
                                    \    Last Location: SEPAHIJAL (dead)
                                  dam\    /sire    House Name:
                                      \  /            Tattoo:
                                       \/           Tag/Band:
                                     00014
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00015
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
                00006  +                            00004  +
                 RITUL                               TAJU
                                  \          /       Sex: Unknown
                                   \        /    Birth Date:  1 Mar 2002
                                    \    Last Location: SEPAHIJAL (dead)
                                  dam\    /sire    House Name:
                                      \  /            Tattoo:
                                       \/           Tag/Band:
                                     00015
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                   Studbook Number:  00016
==========================================================================
                 WILD                                WILD
                                  \          /       Sex: Male
                                   \        /      Birth Date:    ????
                                    \    Last Location: ASSAM     (dead)
                                  dam\    /sire    House Name: RAJA
                                      \  /            Tattoo:
                                       \/           Tag/Band:
                                     00016
```

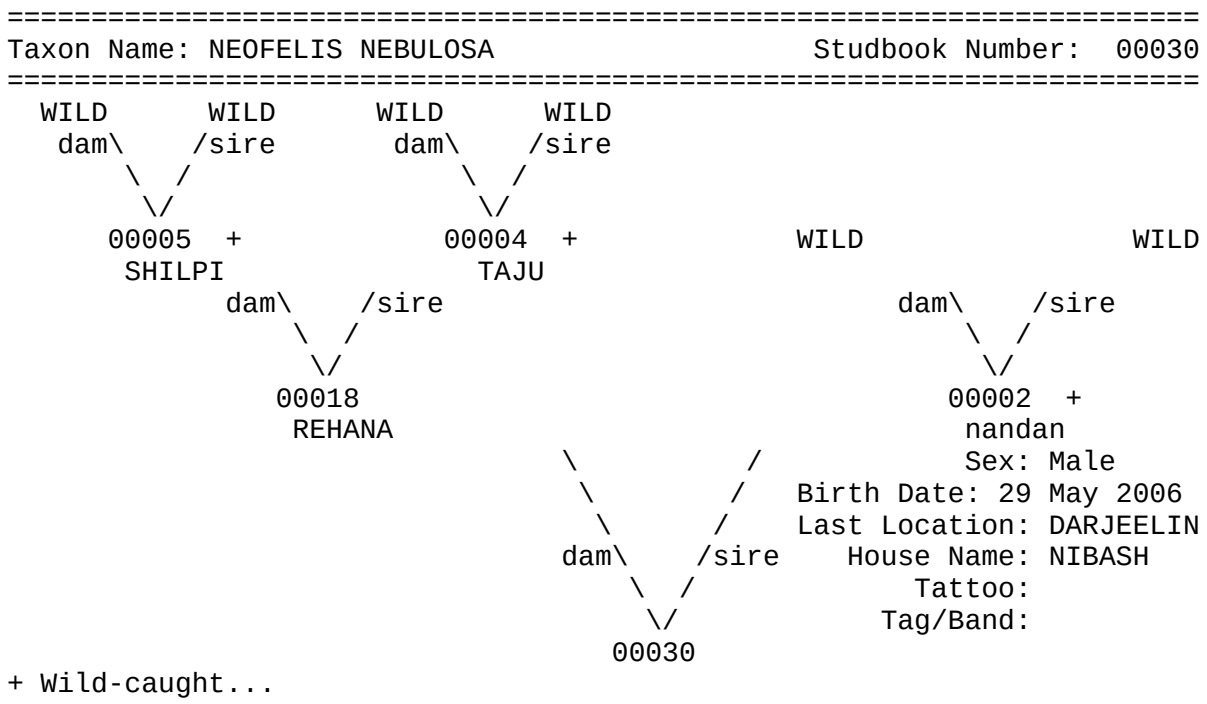
```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00017
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                           dam\    /sire
                 \  /                                    \  /
                  \/                                      \/
                00005  +                                00004  +
                 SHILPI                                  TAJU
                                 \          /            Sex: Female
                                  \        /    Birth Date: 19 Jul 2002
                                   \    Last Location: SEPAHIJAL (dead)
                                 dam\    /sire    House Name: SUPRIYA
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00017
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                   Studbook Number:  00018
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                           dam\    /sire
                 \  /                                    \  /
                  \/                                      \/
                00005  +                                00004  +
                 SHILPI                                  TAJU
                                 \          /            Sex: Female
                                  \        /    Birth Date:  4 May 2003
                                   \      /    Last Location: SEPAHIJAL
                                 dam\    /sire    House Name: REHANA
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00018
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00019
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                           dam\    /sire
                 \  /                                    \  /
                  \/                                      \/
                00005  +                                00004  +
                 SHILPI                                  TAJU
                               \          /
                                \          /            Sex: Male
                                 \        /   Birth Date:  4 May 2003
                                  \    Last Location: SEPAHIJAL (dead)
                                dam\    /sire    House Name: SUBASH
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                   00019

+ Wild-caught...
```

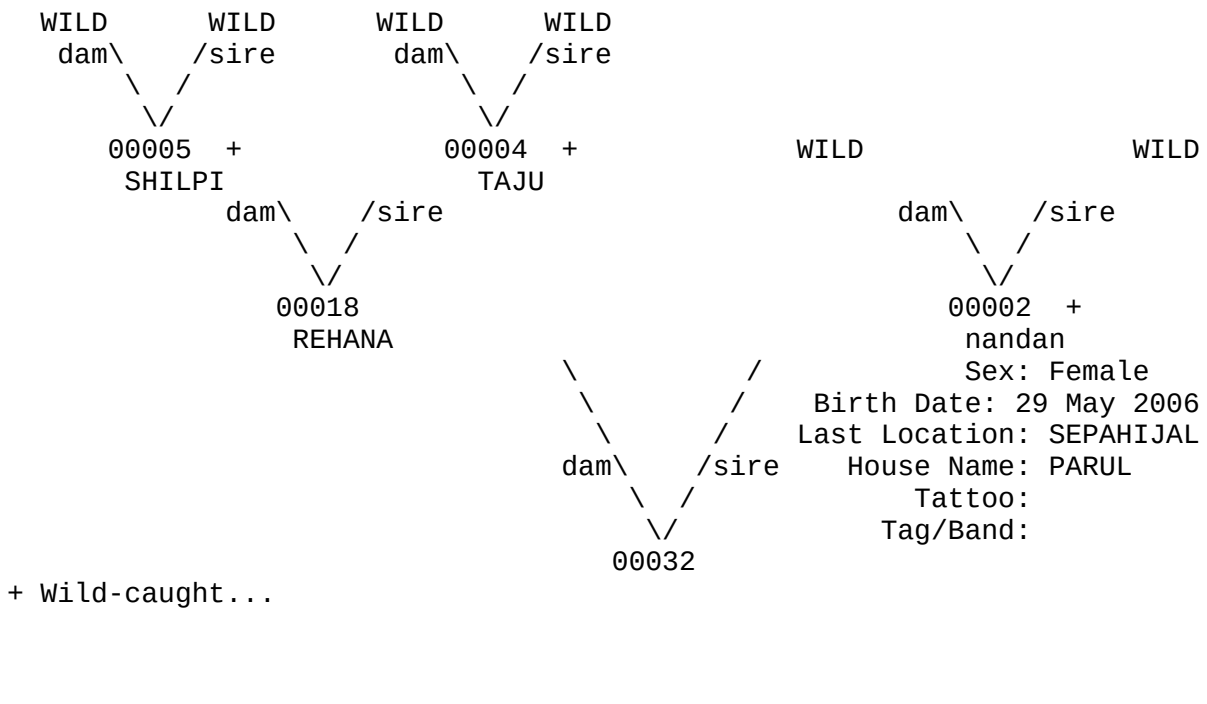
```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00020
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
                00005  +                            00004  +
                 SHILPI                              TAJU
                                \          /         Sex: Female
                                 \        /    Birth Date:  4 May 2003
                                  \      /    Last Location: SEPAHIJAL
                                dam\    /sire    House Name: RESHMI
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                   00020
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00021
==========================================================================
                 WILD                                WILD
                                \          /         Sex: Male
                                 \        /    Birth Date: 23 Mar 2004
                                  \    Last Location: SEPAHIJAL (dead)
                                dam\    /sire    House Name: SIDDIK
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                   00021

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00022
==========================================================================
                 WILD                                WILD
                                \          /        Sex: Female
                                 \        /    Birth Date:  ~ Apr 2004
                                  \      Last Location:SEPAHIJAL(dead)
                                dam\    /sire    House Name: RANI
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                   00022

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00023
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
                00005  +                            00013  +
                 SHILPI                              GHAURA
                                \          /         Sex: Male
                                 \        /     Date: 27 Mar 2005
                                  \    Last Location: SEPAHIJAL (dead)
                                dam\    /sire    House Name: ASOKE
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                   00023
+ Wild-caught...
```

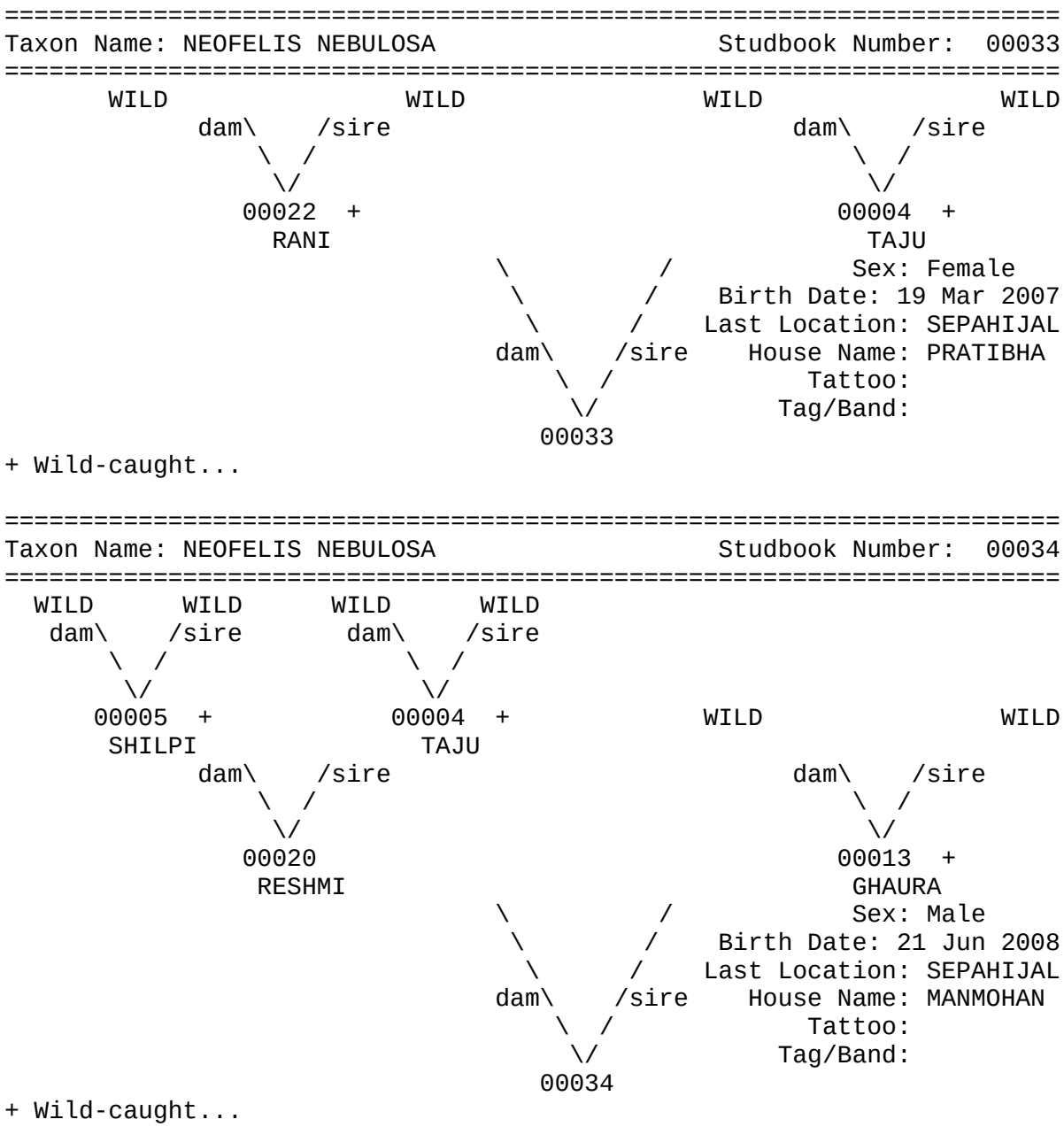
```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00024
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
                00005  +                            00013  +
                 SHILPI                              GHAURA
                                \          /         Sex: Female
                                 \        /    Birth Date: 27 Mar 2005
                                  \      /     Last Location: DARJEELIN
                                dam\    /sire    House Name: PRITI
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                   00024
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00025
==========================================================================
       WILD                WILD                WILD                WILD
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
                00005  +                            00013  +
                 SHILPI                              GHAURA
                                \          /         Sex: Male
                                 \        /    Birth Date: 27 Mar 2005
                                  \    Last Location: SEPAHIJAL (dead)
                                dam\    /sire    House Name: ZIMMI
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                   00025
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00027
==========================================================================
  WILD      WILD      WILD      WILD
   dam\    /sire       dam\    /sire
       \  /                \  /
        \/                  \/
      00005  +            00004  +            WILD                WILD
       SHILPI               TAJU
             dam\    /sire                       dam\    /sire
                 \  /                                \  /
                  \/                                  \/
                00020                               00002  +
                 RESHMI                              nandan
                                \          /         Sex: Female
                                 \        /    Birth Date: 24 Apr 2006
                                  \    Last Location: SEPAHIJAL (dead)
                                dam\    /sire    House Name: PALLABI
                                    \  /             Tattoo:
                                     \/            Tag/Band:
                                   00027
+ Wild-caught...
```


Taxon Name: NEOFELIS NEBULOSA
Studbook Number: 00028
WILD
WILD
WILD
WILD
dam\
/sire
dam\
/sire
00005 +
SHILPI
00004 +
TAJU
WILD
WILD
dam\
/sire
dam\
/sire
00020
RESHMI
00002 +
nandan
Sex: Female
Birth Date: 24 Apr 2006
Last Location: SEPAHIJAL
dam\
/sire
House Name: SANJIT
Tattoo:
Tag/Band:
00028
+ Wild-caught...


Taxon Name: NEOFELIS NEBULOSA
Studbook Number: 00029
WILD
WILD
WILD
WILD
dam\
/sire
dam\
/sire
00012 +
DESHI
00004 +
TAJU
Sex: Male
Birth Date: 13 May 2006
Last Location: SEPAHIJAL
dam\
/sire
House Name: RAHUL
Tattoo:
Tag/Band:
00029
+ Wild-caught...


Taxon Name: NEOFELIS NEBULOSA
Studbook Number: 00030
WILD
WILD
WILD
WILD
dam\
/sire
dam\
/sire
00005 +
SHILPI
00004 +
TAJU
WILD
WILD
dam\
/sire
dam\
/sire
00018
REHANA
00002 +
nandan
Sex: Male
Birth Date: 29 May 2006
Last Location: DARJEELIN
dam\
/sire
House Name: NIBASH
Tattoo:
Tag/Band:
00030
+ Wild-caught...


Taxon Name: NEOFELIS NEBULOSA
Studbook Number: 00032
WILD
WILD
WILD
WILD
dam\
/sire
dam\
/sire
00005 +
SHILPI
00004 +
TAJU
WILD
WILD
dam\
/sire
dam\
/sire
00018
REHANA
00002 +
nandan
Sex: Female
Birth Date: 29 May 2006
Last Location: SEPAHIJAL
dam\
/sire
House Name: PARUL
Tattoo:
Tag/Band:
00032
+ Wild-caught...


Taxon Name: NEOFELIS NEBULOSA
Studbook Number: 00033
WILD
WILD
WILD
WILD
dam\ /sire
dam\ /sire
00022 +
RANI
00004 +
TAJU
Sex: Female
Birth Date: 19 Mar 2007
Last Location: SEPAHIJAL
House Name: PRATIBHA
Tattoo:
Tag/Band:
00033
+ Wild-caught...
Taxon Name: NEOFELIS NEBULOSA
Studbook Number: 00034
WILD
WILD
WILD
WILD
dam\ /sire
dam\ /sire
00005 +
SHILPI
00004 +
TAJU
WILD
WILD
dam\ /sire
dam\ /sire
00020
RESHMI
00013 +
GHAURA
Sex: Male
Birth Date: 21 Jun 2008
Last Location: SEPAHIJAL
House Name: MANMOHAN
Tattoo:
Tag/Band:
00034
+ Wild-caught...

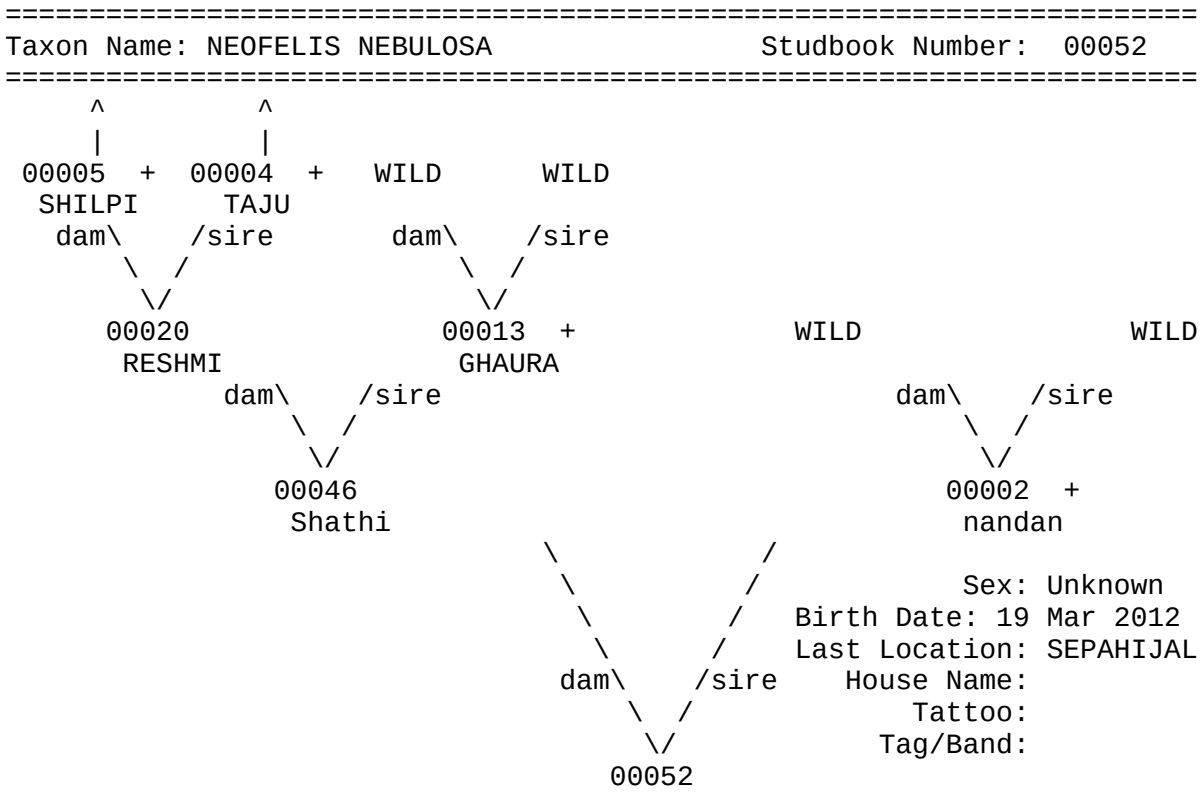
```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00035
==========================================================================
  WILD      WILD      WILD      WILD
   dam\    /sire      dam\    /sire
       \  /               \  /
        \/                 \/
      00005  +           00004  +            WILD                WILD
       SHILPI              TAJU
             dam\    /sire                          dam\    /sire
                 \  /                                   \  /
                  \/                                     \/
                00020                                  00013  +
                 RESHMI                                 GHAURA
                                 \          /           Sex: Female
                                  \        /    Birth Date: 21 Jun 2008
                                   \      /    Last Location: ITANAGAR
                                 dam\    /sire    House Name: MAYABATI
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00035
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00036
==========================================================================
                 WILD                                   WILD
                                 \          /           Sex: Female
                                  \        /      Birth Date:    ????
                                   \      /    Last Location: AIZAWL
                                 dam\    /sire    House Name: TEI
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00036

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00037
==========================================================================
                 UNK                                    UNK
                                 \          /           Sex: Male
                                  \        /      Birth Date:    ????
                                   \    Last Location: AHMEDABAD (dead)
                                 dam\    /sire    House Name:
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00037

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00038
==========================================================================
                 UNK                                    UNK
                                 \          /           Sex: Female
                                  \        /      Birth Date:    ????
                                   \      /    Last Location: KANPUR
                                 dam\    /sire    House Name:
                                     \  /             Tattoo:
                                      \/            Tag/Band:
                                    00038
```

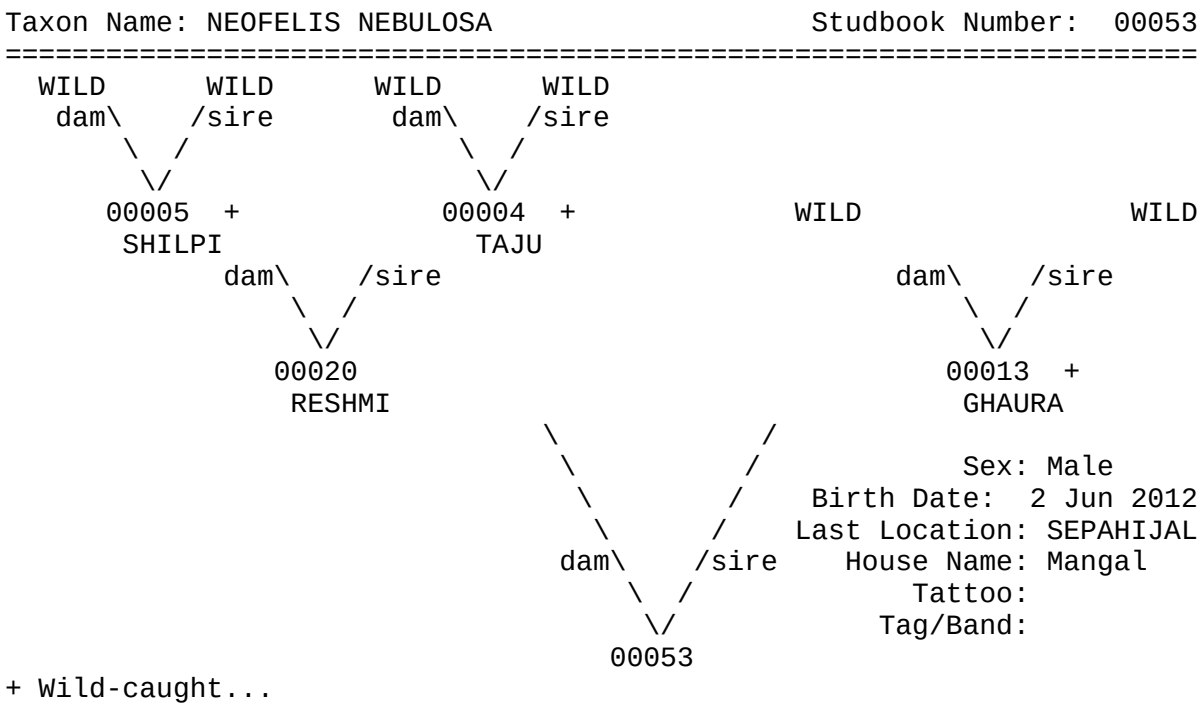
```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00039
==========================================================================
  WILD      WILD      WILD      WILD
   dam\    /sire      dam\    /sire
       \  /               \  /
        \/                 \/
      00005  +           00004  +            WILD                WILD
       SHILPI              TAJU
             dam\    /sire                          dam\    /sire
                 \  /                               \  /
                  \/                                 \/
                00020                              00002  +
                 RESHMI                             nandan
                                \          /        Sex: Female
                                 \        /    Birth Date: 24 Apr 2006
                                  \      /    Last Location: SEPAHIJAL
                                dam\    /sire House Name: MEERA KUMARI
                                    \  /           Tattoo:
                                     \/          Tag/Band:
                                   00039
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00040
==========================================================================
                 WILD                                WILD
                                \          /        Sex: Female
                                 \        /     Birth Date:    ????
                                  \    Last Location: DIMAPUR   (dead)
                                dam\    /sire    House Name: RANI
                                    \  /           Tattoo:
                                     \/          Tag/Band:
                                   00040

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                    Studbook Number:  00041
==========================================================================
                 WILD                                WILD
                                \          /        Sex: Female
                                 \        /    Birth Date:      ~ 1995
                                  \      /    Last Location: SEPAHIJAL
                                dam\    /sire    House Name: MEGH
                                    \  /           Tattoo:
                                     \/          Tag/Band:
                                   00041

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                   Studbook Number:  00042
==========================================================================
                 WILD                                WILD
                                \          /        Sex: Male
                                 \        /    Birth Date:  ~ Mar 2009
                                  \      /    Last Location: ITANAGAR
                                dam\    /sire    House Name: KALU
                                    \  /           Tattoo:
                                     \/          Tag/Band:
                                   00042
```

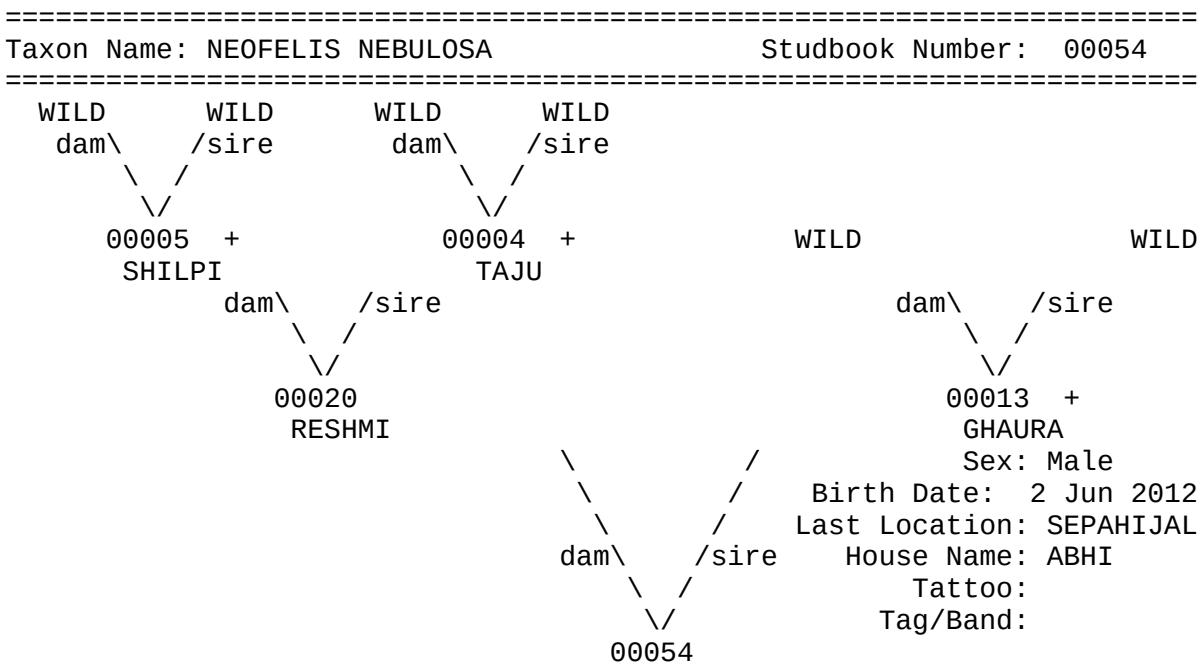
```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00043
==========================================================================
                 WILD                                    WILD
                                 \          /            Sex: Male
                                  \        /      Birth Date:    ????
                                   \    Last Location: DIMAPUR   (dead)
                                 dam\    /sire    House Name: FIODER
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00043

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                   Studbook Number:  00044
==========================================================================
                 WILD                                    WILD
                                 \          /            Sex: Male
                                  \        /    Birth Date:      ~ 2009
                                   \      /    Last Location: SEPAHIJAL
                                 dam\    /sire    House Name: PRASANTA
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00044

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                   Studbook Number:  00045
==========================================================================
  WILD      WILD      WILD      WILD
   dam\    /sire      dam\    /sire
       \  /               \  /
        \/                 \/
      00005  +           00004  +            WILD                WILD
       SHILPI              TAJU
             dam\    /sire                          dam\    /sire
                 \  /                                   \  /
                  \/                                     \/
                00020                                  00013  +
                 RESHMI                                 GHAURA
                                 \          /            Sex: Female
                                  \        /    Birth Date: 14 Mar 2010
                                   \      /    Last Location: SEPAHIJAL
                                 dam\    /sire    House Name: SRITI
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00045
+ Wild-caught...
```

```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00046
==========================================================================
  WILD      WILD      WILD      WILD
   dam\    /sire       dam\    /sire
       \  /                \  /
        \/                  \/
      00005  +            00004  +            WILD                WILD
       SHILPI              TAJU
             dam\    /sire                          dam\    /sire
                 \  /                                   \  /
                  \/                                     \/
                00020                                  00013  +
                 RESHMI                                 GHAURA
                                 \          /           Sex: Female
                                  \        /    Birth Date: 14 Mar 2010
                                   \      /    Last Location: SEPAHIJAL
                                 dam\    /sire    House Name: Shathi
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00046
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                  Studbook Number:  00047
==========================================================================
                 WILD                                   WILD
                                 \          /           Sex: Male
                                  \        /     Birth Date:    ????
                                   \      /    Last Location: GANGTOK
                                 dam\    /sire    House Name: KHAMSUNG
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00047

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                Studbook Number:  00048
==========================================================================
  WILD      WILD      WILD      WILD
   dam\    /sire       dam\    /sire
       \  /                \  /
        \/                  \/
      00022  +            00004  +            WILD                WILD
        RANI                TAJU
             dam\    /sire                          dam\    /sire
                 \  /                                   \  /
                  \/                                     \/
                00033                                  00002  +
                PRATIBHA                                nandan
                                 \          /
                                  \        /           Sex: Female
                                   \      /    Birth Date: 14 Apr 2011
                                    \    /    Last Location: SEPAHIJAL
                                 dam\    /sire    House Name: LILY
                                     \  /            Tattoo:
                                      \/           Tag/Band:
                                    00048
+ Wild-caught...
```

```
==========================================================================
Taxon Name: NEOFELIS NEBULOSA                Studbook Number:  00049
==========================================================================
  WILD      WILD      WILD      WILD
   dam\    /sire       dam\    /sire
       \  /                \  /
        \/                  \/
      00022  +            00004  +            WILD                WILD
        RANI                TAJU
             dam\    /sire                          dam\    /sire
                 \  /                                   \  /
                  \/                                     \/
                00033                                  00002  +
                PRATIBHA                                nandan
                                  \          /          Sex: Female
                                   \        /    Birth Date: 14 Apr 2011
                                    \      /    Last Location: SEPAHIJAL
                                  dam\    /sire    House Name: JOY/JUI
                                      \  /            Tattoo:
                                       \/           Tag/Band:
                                     00049
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                Studbook Number:  00050
==========================================================================
  WILD      WILD      WILD      WILD
   dam\    /sire       dam\    /sire
       \  /                \  /
        \/                  \/
      00005  +            00004  +            WILD                WILD
       SHILPI              TAJU
             dam\    /sire                          dam\    /sire
                 \  /                                   \  /
                  \/                                     \/
                00020                                  00002  +
                 RESHMI                                 nandan
                                  \          /          Sex: Female
                                   \        /    Birth Date:  1 Jul 2011
                                    \      /    Last Location: SEPAHIJAL
                                  dam\    /sire   House Name: JITEN/JULY
                                      \  /            Tattoo:
                                       \/           Tag/Band:
                                     00050
+ Wild-caught...

==========================================================================
Taxon Name: NEOFELIS NEBULOSA                Studbook Number:  00051
==========================================================================
                 WILD                                    WILD
                                  \          /          Sex: Female
                                   \        /      Birth Date:    ????
                                    \      /    Last Location: SHILLONG
                                  dam\    /sire    House Name:
                                      \  /            Tattoo:
                                       \/           Tag/Band:
                                     00051
```


Taxon Name: NEOFELIS NEBULOSA
Studbook Number: 00052
00005 + 00004 + WILD WILD
SHILPI TAJU
dam\ /sire dam\ /sire
00020 00013 + WILD WILD
RESHMI GHAURA
dam\ /sire dam\ /sire
00046 00002 +
Shathi nandan
Sex: Unknown
Birth Date: 19 Mar 2012
Last Location: SEPAHIJAL
House Name:
Tattoo:
Tag/Band:
00052
+ Wild-caught...
^ Pedigree continues beyond top of page...


Taxon Name: NEOFELIS NEBULOSA
Studbook Number: 00053
WILD WILD WILD WILD
dam\ /sire dam\ /sire
00005 + 00004 + WILD WILD
SHILPI TAJU
dam\ /sire dam\ /sire
00020 00013 +
RESHMI GHAURA
Sex: Male
Birth Date: 2 Jun 2012
Last Location: SEPAHIJAL
dam\ /sire House Name: Mangal
Tattoo:
Tag/Band:
00053
+ Wild-caught...


Taxon Name: NEOFELIS NEBULOSA
Studbook Number: 00054
WILD
dam
sire
00005 +
SHILPI
00004 +
TAJU
WILD
WILD
00020
RESHMI
00013 +
GHAURA
Sex: Male
Birth Date: 2 Jun 2012
Last Location: SEPAHIJAL
House Name: ABHI
Tattoo:
Tag/Band:
00054

+ Wild-caught...