

# NATIONAL STUDBOOK

## SNOW LEOPARD (*Panthera uncia*) II Edition

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

**Data: Till December 2014**

**Published: February 2015**



भारतीय वन्यजीव संस्थान  
Wildlife Institute of India



केन्द्रीय चिड़ियाघर प्राधिकरण  
Central Zoo Authority



# NATIONAL STUDBOOK

## Snow leopard (*Panthera uncia*) II Edition

---

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

### ***Compiled and Analyzed by***

Ms. Nilofer Begum  
Junior Research Fellow

### ***Project Consultant***

Dr. Anupam Srivastav, Ph.D.

### ***Supervisors***

Dr. Parag Nigam  
Shri. P.C. Tyagi IFS

Copyright © WII, Dehradun, and CZA, New Delhi, 2015

This report may be quoted freely but the source must be acknowledged and cited as:

Wildlife Institute of India (2015). National Studbook of Snow leopard (*Panthera uncia*), Wildlife Institute of India, Dehradun and Central Zoo Authority, New Delhi. TR. No. -2015/ 002 pages 67

---

For correspondence:

Principal Investigator, Studbook Project,  
Wildlife Institute of India,  
PO Box 18, Dehradun, 248001  
Uttarakhand, India



## 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 second edition of the National studbook for Snow leopard (*Panthera uncia*) in Indian zoos. The pairing 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**



## **ACKNOWLEDGEMENTS**

This report is a part of the assignment to the Wildlife Institute of India, Dehradun by the Central Zoo Authority, New Delhi on the development and maintenance of studbooks of selected endangered species in Indian zoos.

The authors are thankful to the Central Zoo Authority for the financial support in carrying out the assignment. The guidance and support extended by Shri. B.S. Bonal IFS, Member Secretary, CZA is gratefully acknowledged. The authors also thank Dr. Brij Kishore Gupta, Evaluation and Monitoring Officer, Dr. Devender Singh, Scientific Officer and the support staff of the Central Zoo Authority for facilitating this work.

The valuable advice and support provided by Dr. V.B. Mathur, Director, WII and Dr. P.K. Mathur, Dean Faculty of Wildlife Sciences, is duly acknowledged. We also thank Mr. Mukesh Arora for layout and design of this document.

Authors sincerely acknowledge the support from zoo directors, biologists, curators and veterinarians from the following contributing zoos for providing pedigree information that led to the successful development of the studbook.

Himalayan Nature Park, Kufri  
Himalayan Zoological Park, Gangtok  
Padmaja Naidu Himalayan Zoological Park, Darjeeling  
Pandit Govind Ballabh Pant High Altitude Zoo, Nainital

**Authors**





## Contents

	Page No.
Species Biology	1
Distribution	4
Status in Wild	5
Threats and Conservations Measures	5
Status in captivity	6
Methods	6
Scope of the Studbook and Data Quality	7
Analysis	7
Demographic Analysis	7
Genetic Analysis	10
Breeding Recommendations	10
Conclusions and Recommendations	12
References	13
<b>Appendix I -</b> Historical Population	16
<b>Appendix II -</b> Living Population (Location Wise)	20
<b>Appendix III -</b> Pedigree Chart Report	21



## Species Biology

Snow leopards are apex predators inhabiting rugged and extreme environments in the trans-Himalayas, central Asian highlands to the cold deserts of Mongolia. Their prey base includes medium sized ungulates, rodents and birds depending on local availability.

### Taxonomy

Phylum	Choradata
Class	Mammalia
Order	Carnivora
Family	Felidae
Sub-family	Pantherinae
Genus	<i>Panthera</i> (Gray 1854)
Species	<i>Panthera uncia</i> (Schreber 1775)



The species was placed in the family *Felidae*, subfamily *Pantherinae* based on structural similarities in skull common with lions, tigers and jaguars (Dang 1967). However it differs from the other members of the subfamily in possessing a unique ill-developed hyoid apparatus which is partly ossified with slightly thickened, vocal folds that limit it from roaring (Hemmer 1972, Hast 1987). Based on these differences in the hyoid bone, Grzimek (1972), recommended that Snow leopard be placed under the generic name *Uncia* in the subfamily *Pantherinae*. Phylogenetic analysis by Johnson *et al.* (2006) showed that Snow leopard is most closely related to the tiger (*Panthera tigris*) with the divergence time estimated to be 2 million years. Johnson and O'Brien (2007) placed Snow leopard in the genus *Panthera* based on mitochondrial DNA analysis and suggested that Snow leopard was amongst the earliest members of this group to diverge from their last common ancestor after Clouded leopard. Therefore, the Snow leopard is now placed in the genus *Panthera*.

### General biology

The pelage colour varies between pale gray to cream-gray with a paler underbelly. The head, neck and lower limbs have solid spots while the lateral sides and tail have rosettes encircling small dark spots. A row of elongated dark spots extends along the dorsal median side. The skull is short and broad, with a broad forehead to accommodate the wide expanse of the nasal cavity; a likely adaptation to the extreme habitat they occupy. They have powerful hind legs, longer than the forelimbs that enable them to jump up to six metres. The body is covered with furry coat with longer hairs during winters that provide insulation (Hemmer 1972).

**Table 1:** Body measurements of snow leopard\*

Characteristics	Range
Body length	1.0 – 1.3 m
Tail length	0.8 – 1.0 m
Shoulder height	0.6 m
Body weight (Adult)	25 – 75 kg

\* Source Hemmer (1972)

### Reproductive biology

Snow leopards in captivity have been reported to reach sexual maturity by 3 – 6 years of age (Blomqvist and Sten 1982). Females produce litters till 11 years of age, after which the productivity declines. The estrus period ranges between 2 – 8 days with varying estimates reported by various studies (Sadler 1966; Kitchner *et al.* 1975; Blomqvist and Sten 1982). The species is a seasonal breeder with onset of mating in January and continuing till April (Andriuskevicius 1980; Blomqvist and Sten 1982; Mallon 1985; Ahlborn and Jackson 1988). Observations of snow leopards in captive conditions, suggest that mating takes place from January to March (Blomqvist and Sten 1982). Most captive-births have been recorded between late March and early September, with a peak in May (Freeman and Hutchins 1978; Blomqvist and Sten 1982; Rieger 1982). The age at dispersal in wild snow leopards is not known, however it has been estimated at around 18-22 months of age and cubs are known to be fully dependent on their mother for food and protection (Jackson 1996)

**Table 2:** Life history traits of Snow leopards\*

Mating season	Late January and mid-March
Gestation period	93 to 110 days
Birth seasonality	March to early September
Litter size in wild	Average=2-3; range= 1-5
Litter size in captivity	Average=2.2; range= 1-4 cubs, 2.2
Inter-birth interval in wild	At least 2 years in wild
Inter-birth interval in captivity	1 year in captivity
Age at dispersal	18-22 months

\* The table is based on information from various sources

### Habitat and ecology

Snow Leopards inhabit alpine and sub-alpine ecological zones (McCarthy *et al.* 2003). The habitat preference of Snow leopards is guided by the presence of sheltered places for bedding sites, close to ridgelines, stream-beds and other linear features used for travelling around their home range and prey availability (Chundawat 1991; Jackson 1996).

The home range size of the species in Nepal ranged between 12 to 39 square kilometres, with a high degree of spatial overlap, both within and between sexes (Jackson 1996). The average distances travelled daily by males was 1.9 km, while that for females was 2.2 km. Home ranges are spatially overlapping but have temporally separated core areas with a high degree of spatial overlap, both within

and between sexes. Core areas were preferred over other parts of the home range with 42–60% of home-range use occurring within only 14–23% of the total home range. Adult males have the highest spatial separation (5.4 km) followed by separation between males and females (4.0 km) while adult females (2.6 km) are the most tolerant of same sex individuals (Jackson 1996). Lack of food resources may lead to increased home ranges for both males and females (Mc Carthy *et al.* 2005).

Food habits in snow leopard have been studied in Ladakh, India by Chundawat and Rawat (1994); in Nepal by Oli *et al.* (1993), in North Pakistan Anwar *et al.* (2011) and in Qinghai, China by Schaller *et al.*(1988). These reports indicate that the preferred prey base for snow leopards consists of medium-sized ungulates like blue sheep, Himalayan tahr, musk deer and livestock (Schaller *et al.* 1988; Oli *et al.* 1993; Chundawat and Rawat 1994; Jackson 1996; Bagchi and Mishra 2006). Smaller prey like hare, pika, marmot, rodents, mustelids, and canids were also a part of their diet in central Asia, India, and Nepal (Schaller *et al.* 1988; Heptner and Sludskii 1992; Oli *et al.* 1993; Chundawat and Rawat 1994; Jackson 1996; Bagchi and Mishra 2006).



The acute paucity of natural prey species in North Pakistan accounts for the large percentage of livestock (70%) in the food biomass in comparison to wild ungulates like ibex (20.5%) and markhor (7.4%) (Anwar *et al.* 2011). Snow leopards also prey upon game birds like snow cock (*Tetraogallus tibetanus*, *T. altaicus* and *T. himalayensis*), chukor (*Alectoris chukor*) and snow partridge (*Lerwa lerwa*) (Heptner and Sludskii 1992; Mallon 1984; Schaller 1977).

### **Behaviour**

Snow leopards are crepuscular in their activity pattern, with peaks in activity at both dawn and dusk (Schaller *et al.* 1994). Information on the feeding behaviour of Snow leopards is scarce. However, studies suggest that the kill is hidden in vegetative or rocky cover, where it feeds and rests until all the meat has been consumed. Feeding is initiated from the groin towards the thigh region (Jackson 1996). Observations at the Langu valley, Nepal and In Ladakh suggest Snow leopards can almost completely consume their kills (including the viscera), provided they were guarded from scavengers (Fox and Chundawat 1988; Jackson 1996).

For the sparsely distributed, solitary top predator communication through marking behaviour plays a very important role in its social interaction system than among other felids (Sharma *et al.* 2006). Both sexes of Snow leopards are characterized by intensive marking behaviour (Schaller 1977). Markings consist of scrapes, faeces, urine and/or anal scent, scent-sprayed rock, and claw-raked tree trunks (Ahlborn and Jackson 1988). Scraping (new scrapes and re-scraping of existing marks) and scent-spraying are the two most abundant form of marking behaviour. Marking behaviour allows for spatial and temporal spacing of animals and also for detecting receptive females during the mating season. Markings are strongly concentrated in high use areas of their home ranges and serve to avoid conspecific conflicts (Ahlborn and Jackson 1988).

### **Social and breeding behaviour**

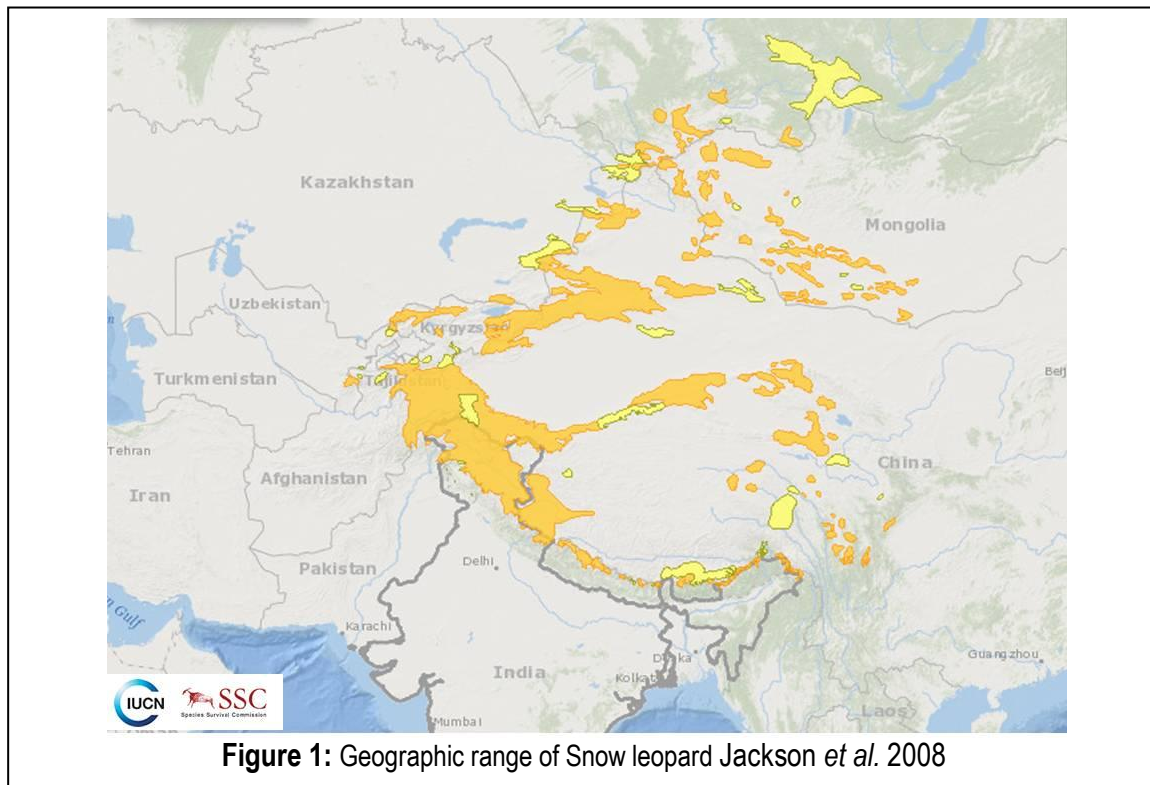
Limited information is available on the social and breeding behaviour of the species due to its elusive nature and inaccessible field conditions. Like most species of cats, snow leopards are solitary animals except mating pairs and females with cubs. Mating is strongly seasonal in wild snow leopards. Marking and vocalization, especially by males increase during the breeding season (Jackson 1996).

Studies in captivity indicate that heterosexual pairs have a high degree of tolerance for each other. In captivity, breeding interactions are characterized by an increase in pre-copulatory contact behaviours (like sniffing of the ano-genital area, social grooming, head and body rubbing; low-intensity vocalizations of "*prusten*," particularly by the female; standing and moving in close proximity; and playful stalks and pounces (Freeman 1983). Copulation occurs over a 3-6-day period. During mounting the male usually grips the fur on the female's neck. The most common copulatory posture is a ventral/dorsal position; however ventral/ventral copulatory position has also been reported (Freeman 1983). Successfully mated individuals of both sexes were found to be more active and spent more time interacting with each other, grooming themselves, and showing "*flehmen*" in response to sniffing while unsuccessful males appeared to be more restless and spent more time pacing (Freeman 1983).

### **Distribution**

The species is widely distributed across central- Asia with a range extending through twelve countries; namely Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan. The core areas include mountainous regions in Altai, Tian Shan, Kun-Lun, Pamir, Hindu Kush, Karakorum and Himalayas (Mallon 1985; Fox 1994; Schaller, 1998; McCarthy 2000; McCarthy *et al.* 2003).

The estimated potential range of the species is approximately 3 million km, with a large part of it in Mongolia and the Tibetan plateau of China (Hunter and Jackson 1997). However, they are found in only



1.83 million km, with only approximately 550,000 km to be good habitat (Hunter and Jackson 1997, McCarthy and Chapron 2003). Williams (2006) used historical data to improve mapping of the potential range, but a significant lack of information about current snow leopard status across much of its known and potential distribution still exists.

### Status in the Wild

Fox (1989) estimated the world population at 3,350-4,050 animals. These figures were updated to between 4,510 and 7,350 snow leopards within a total potential habitat area of 1,835,000 km<sup>2</sup> (Fox 1994). Nowell and Jackson (1996) estimated the total effective population size of snow leopard as 2,500 mature breeding individuals with a declining trend.

### Threats and Conservations Measures

Illicit hunting for fur, bones, and other body parts are identified as major threats in central Asia. Livestock depredation by the species with associated retaliatory killing and habitat loss due to the high density of livestock all threaten the long-term viability of Snow leopard in various parts of its range (Wang 1998; McCarthy and Chapron 2003; Hussain 2003; Din and Nawaz 2011).

The snow leopard population is believed to be declining throughout its range, and hence, it has been listed by the IUCN as Endangered in the IUCN Red List of Threatened Species since 1988 (Jackson *et al.* 2008 ). Snow leopards have been included in Appendix I of the Convention on International Trade in



Endangered Species of Fauna and Flora (CITES) since 1975, and hence all international commercial trade in the species, its parts and derivatives is prohibited. With the exception of Kyrgyzstan and Tajikistan, all snow leopard range states are a Party to CITES, however, implementation and enforcement of the Convention's provision varies in the different countries (McCarthy and Chapron 2003). Snow leopards are protected nationally over most of its range, with the probable exception of Afghanistan (McCarthy and Chapron 2003). The snow leopard is protected in India under the National Wildlife (Protection) Act of 1972 as well as under the Jammu and Kashmir Wildlife (Protection) Act of 1978, and is listed in Schedule I of both acts.

### Status in Captivity

The first regional breeding program for snow leopards was established in North-America in 1984 (Wharton and Freeman 1988, Wharton and Mainka 1997), which was followed by an EEP in 1987. Subsequently, breeding programs were established in Japan, Russia, Australia and in India in the 1990's. The entire captive population is managed as a "meta-population" and the records of all the animals involved in the breeding programmes are managed and co-ordinated with an International Studbook. The global captive population of Snow leopard consists of 395 (196.197.2) individuals and are currently maintained in captivity in 154 facilities across 4 continents - Asia, Australia, Europe, North America (Figure 2) (ZIMS data until 2014). This edition of the National Studbook records a total of 75 individuals from the Indian captive population for this species details of which are provided in Table 3.

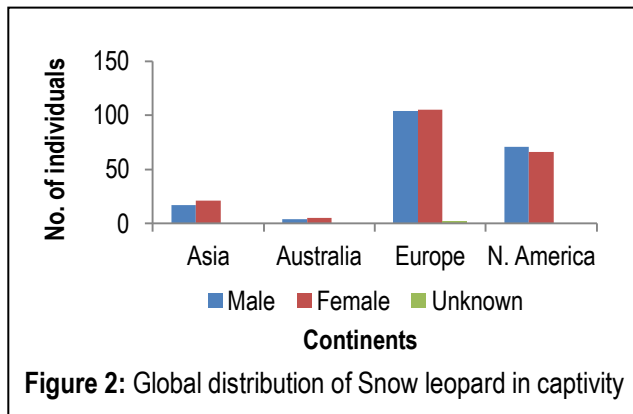


Figure 2: Global distribution of Snow leopard in captivity

Table 3: Status of Snow leopards in Indian zoos

Location	Total no. of individuals (M.F.U)	Living individuals (M.F.U)	Time span during which Snow leopards were kept (years)	Births (M.F.U)	Deaths (M.F.U)
Darjeeling	30.39.6	6.8.0	1986-14 (29)	26.30.6	22.27.6
Gangtok	2.2.0	0.1.0	2005-14 (10)	0.0.0	1.1.0
Nainital	1.1.0	0.0.0	2004-10 (7)	0.0.0	1.1.0
Shimla	1.1.0	0.0.0	2004-07 (4)	0.0.0	0.1.0

### Methods

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



### Scope of the Studbook and Data Quality

The second edition of the National Studbook of the species includes pedigree data of both living and historic population. It also includes records of ancestry of animals acquired from institutions outside India, traced to their wild origin founders. The quality of data of the Snow leopard captive population in Indian zoos is summarized in Figure 3. Records of both parents were available for 54 out of the 61 births in captivity and 11 out of 12 imports.

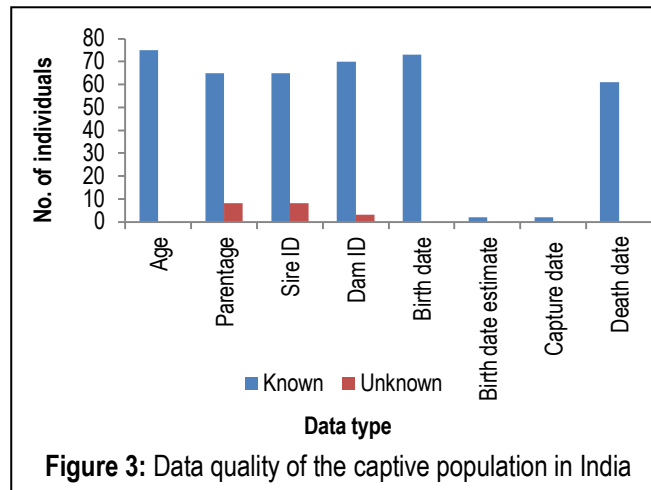


Figure 3: Data quality of the captive population in India

For captive-births identification of dam was known for 59 individuals while sires were known for 54 individuals. Birth dates were available for all the captive-born as well as the imported individuals. Birth date estimates and capture dates were available for both the wild-born individuals and death dates were available for all the 61 mortalities recorded.

## ANALYSIS

### Demographic Analysis

#### Historical population

##### Census trends

The historical population (including the living population) consists of 75 individuals (28 males, 36 females, 11 unknown). Of these 2 (0.2.0) were wild-born, 61 (23.27.11) were captive-born, and 12 (5.7.0) individuals were acquired from institutions outside India. The census trends based on origin of animals is represented in figure 4 and figure 5 represents the sex based census trends of the captive population.

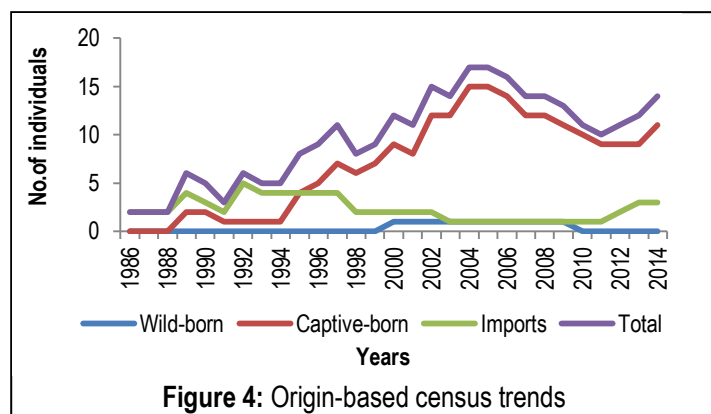


Figure 4: Origin-based census trends

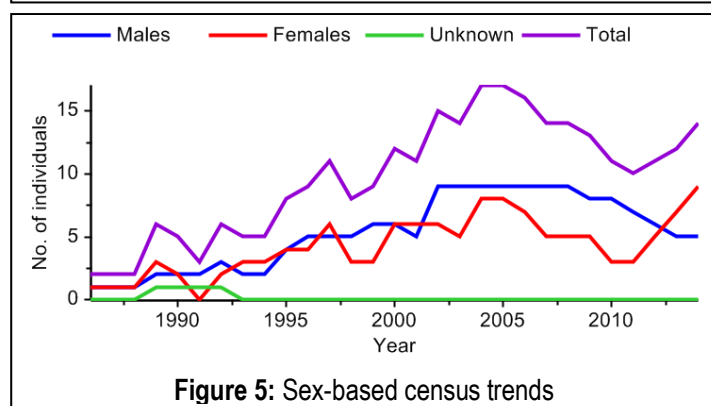


Figure 5: Sex-based census trends

Snow leopards were first housed in captivity in India in 1986 when 2 individuals (1.1) were acquired by Darjeeling from Eichberg and Zurich zoos respectively. Over the next 9 years,

6 more captive-born individuals (3.3) were imported from Toledo, Litterock and Zurich. The first birth in captivity was recorded in the year 1987; however the individual did not survive. Post 1990, the size

decreased due to 3 mortalities (2 imported and 1 captive-born). The population peaked in 2004-05 and consisted of 17 specimens. Thereafter, the population showed a declining trend till 2012. During 2012-2014, the population was supplemented with acquisition of 3 specimens (of which one did not survive) and 3 captive-births. The present population includes 14 specimens.

Figure 4 shows that the population growth was mainly due to specimens of captive origin both acquired from institutions outside India and those born in Indian zoos. Overall, the population has remained very small with a median of only 11 individuals ( $9.72_{\text{Mean}} \pm 4.63_{\text{SD}}$ ) per year. The sex-based census trend (Figure 5) depicts a male bias between 2002 – 2011 as a result of skewed birth sex ratio and higher mortality rate for females. From 2011 onwards, 6 births (1.5.0), and 4 acquisitions (1.3.0) from institutions outside India occurred; however, both the captive-born and imported male Snow leopards failed to survive. This in turn, led to the current female-biased sex-ratio in the population with 14 specimens (5.9:0.). The historical population is summarized in table 4 below and the details of events for each specimen are presented in Appendix I.

**Table 4:** Summary of the historical population

	Males	Females	Unknown	Total
Total studbook size	28	36	11	75
Total number of acquisitions from wild	0	2	0	2
Total number of births	23	27	11	61
Total number of imports	5	7	0	12
Total number of deaths	23	27	11	63
Total number of breeding individuals	7	9	0	16
Wild-born that have bred	0	1	0	1
Captive-born that have bred	3	3	0	6
Imported individuals that have bred	4	5	0	9

### Living population

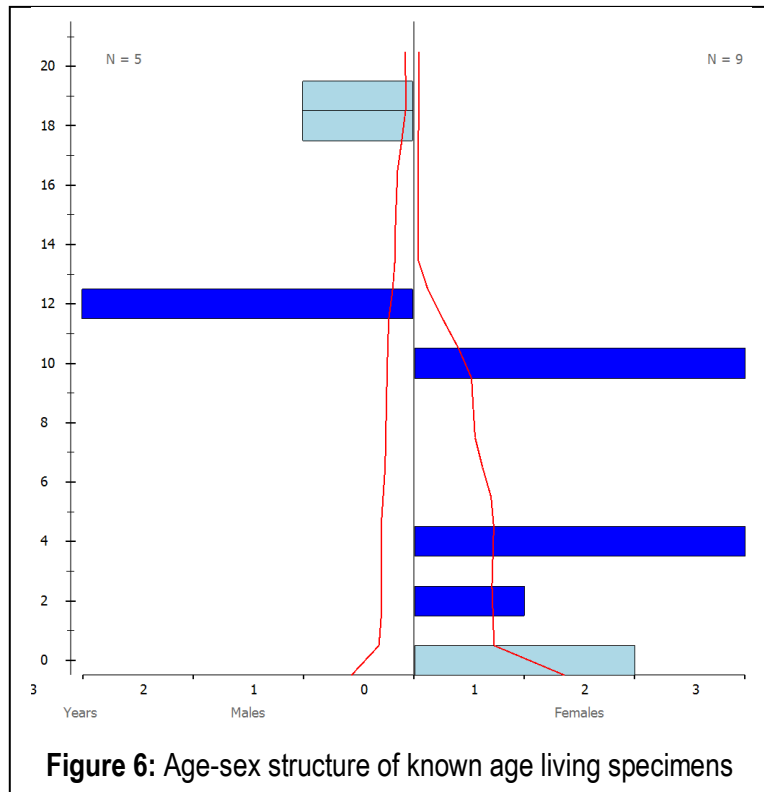
The current population as on December 2014 consisted of 14 individuals (5.9.0). Of these, 11 (5.6.0) were captive-born and 3 (0.3.0) were acquired from institutions outside India. An overview of the current captive population is provided in Table5 and the details of events of the living individuals are provided in Appendix II.

**Table 5:** Summary of the living population

	Male	Female	Unknown	Total
Total number of individuals	5	9	0	14
Total number of wild-born individuals	0	0	0	0
Total number of captive-born individuals	5	6	0	11
Total number of imports	0	3	0	3
Total number of breeding individuals	2	1	0	3
Wild-born that have bred	0	0	0	0
Captive-born that have bred	3	1	0	4
Imported individuals that have bred	0	1	0	1

### Age-sex structure

The current age–sex distribution of known age living individuals is suggestive of an aging population with the post-reproductive age class forming more than half of the total population (Figure 6). There is a deficit of animals in the reproductive age-classes due to the high rate of mortality of cubs before reaching sexual maturity. Over-all, the age-sex structure is female biased. These attributes of the population are suggestive of a declining population facing imminent crash due to the absence of reproductively active males in it.



### Population growth rates

The Snow leopard data set contains small sample sizes for life-table analysis that limit accuracy of the results. The analysis is only indicative in nature and excluded from the present report. Table 6 summarizes the growth rates obtained from the analysis carried out and indicate a declining population with a long mean generation time of 8 years. The predicted number of individuals after 20 years is only 12 (7.5).

**Table 6:** Population growth rates

	Male	Female	Total
Instantaneous rate of change (r)	-0.027	-0.029	-0.028
Population growth rate ( $\lambda$ )	0.974	0.971	0.973
Mean generation time (T)	8.7	7.2	8
Current N	5	9	14
N at 20 years	7	5	12

## Genetic Analysis

### Genetic summary of the Snow leopard population

The captive population of Snow leopards in Indian zoos includes 2 wild-born individuals of which 1 bred and has a living descendant in the population. Of the 12 specimens acquired from institutions outside India, 10 have bred and 2 individuals are yet to contribute to the gene-pool. The ancestry of the 12 imported Snow leopards in the captive-breeding programme was traced back to known founders from records in the International Studbook of Snow leopard (Blomqvist 2008). Incorporation of these pedigree relationships in the National Studbook shows that the current Indian population has descended from 40 wild-born individuals acquired from different parts of the world, resulting in modified values of genetic diversity measures present in the current population as compared to the first edition of the National Studbook of Snow leopard (Srivastav *et al.* 2009).

This edition shows 40 founders as contributing to the population, compared to 1 in the previous edition. The 39 additional founders were/are held in institutions outside India. The improved pedigree information has also resulted in an increased genetic diversity retained and associated founder genome equivalents represented in the population. Planned breeding choices have maintained inbreeding at a low level as depicted by the mean inbreeding coefficient of the population (table 7); however the small population size has resulted in an increased relatedness in the population as depicted by the value of population mean kinship. Therefore, specimens in the current population have large complex pedigrees with no living wild-born founders.

**Table 7:** Genetic summary

	Current	Potential
Founders	40	2 (acquired from institutions outside India)
Gene Diversity	0.8567	0.9069
Founder Genome Equivalents	3.49	5.37
Population Mean Kinship	0.1433	
Mean Inbreeding	0.025	

### Breeding Recommendations

The objectives of an *ex-situ* conservation program are to maintain captive populations that are genetically viable and demographically stable capable of providing surpluses for reintroduction till the species is secure in its natural habitat. Maintenance of genetic viability is ensured by planned pairing choices that ensure retention of maximum genetic diversity in the population. Population planning also needs to consider the demographic stability of the population; *i.e.* the presence of adequate number of animals that can ensure the long term survival of the species. It enables managers to determine the population size needed to be maintained in captivity and provides the decision support system needed for interventions.

The species is part of an ongoing international species conservation programme therefore population planning has been excluded from this edition of the studbook; however, breeding recommendations for maintaining genetic diversity are provided. These are based on 'Mate suitability index' (for details refer box below) that take in to account multiple measures of genetic diversity and provide an improved estimate of the genetic consequences of any pairing.

### Mate Suitability Index (MSI)

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

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

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

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

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

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

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

### Using Pairwise Info

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

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

The mating choices available are presented in table 8; these have been made based on retaining maximum genetic diversity in the population while allowing for the needed increase in population size.

**Table 11:** Pairing choices

Dam ID	Possible Sires	MSI score
00037	00035	4
	00034, 00038	5
	00017	6
00211	00016, 00017	2
	00034, 00035	4
	00038	5
00212	00016, 00017, 00035	2
	00034, 00038	4
00213	00016, 00017, 000334, 00035	2
	00038	3

## Conclusions and Recommendations

Snow leopard is an endangered felid inhabiting a habitat being increasingly threatened by anthropogenic activities. International action was accordingly initiated for ensuring the long term survival of the species. A part of this initiative was the ex-situ conservation of the species in zoological institutions globally. The Indian population maintained at four zoos, a part of this global effort is characterized by:

- Small size of the living population ( $N = 5.9.0.14$ ), with a female biased sex ratio.
- The population has a low reproductive rate; this combined with the high mortality rate of pre-reproductive age individuals has further restricted population growth.
- Individuals in the population are closely related to each other with a high population mean kinship (0.1433), suggestive of a loss in genetic diversity over generations.

The population size needs augmentation by inclusion of additional wild origin founders or specimens of unrelated descent not represented in the current population; to ensure the presence of adequate number of individuals for ensuring the survival of the population over an extended period of time. The suggested supplementation can address the issue of low reproductive output by ensuring the availability of additional mating pairs. Additionally it can also ensure maintenance of desired levels of genetic diversity in the population by providing improved pairing choices.

## References

1. Ahlborn, G. and Jackson, R. M. (1988). Marking in free-ranging snow leopards in west Nepal: a preliminary assessment. Pp 25-49 in H. Freeman, (ed.). Proceedings of the Fifth International Snow Leopard Symposium. Snow Leopard Trust and the Wildlife Institute of India, India.
2. Andriuskevicius, A. (1980). Occurrence of snow leopards in the Soviet Union. International Pedigree Book of Snow Leopards 2:49-54.
3. Anwar, M.B., Jackson, R., Nadeem, M.S., Janečka, J.E., Hussain, S., Azhar Beg, M., Muhammad, G. and Qayyum, M. (2011). Food habits of the snow leopard (*Panthera uncia*) (Schreber, 1775) in Baltistan, Northern Pakistan.???
4. Bagchi, S. and Mishra, C. (2006). Living with large carnivores: predation on livestock by the snow leopard *Uncia uncia*. J. Zool. (Lond.) 268, 217–224.
5. Ballou, J.D., Lacy, R.C. and Pollak, J.P. (2011). PMx: software for demographic and genetic analysis and management of pedigreed populations (version 1.2). Chicago Zoological Society, Brookfield, IL, USA. Available from: <http://www.vortex10.org/PMx.html>.
6. Blomqvist, L. and Sten, I. (1982). Reproductive biology of the Snow Leopard, (*Panthera uncia*). - Int. Ped. Book of Snow Leopards 2:71-79.
7. Blomqvist, L. (2008). International Pedigree Book for Snow leopards, *Uncia uncia* Volume 9. Helsinki Zoo.
8. Chundawat, R. S. (1991). Habitat selection by snow leopard in Hemis National Park, India. International Pedigree Book of Snow Leopards, 6: 85–92.
9. Chundawat, R.S. and Rawat, G.S. (1994). Food habits of snow leopard in Ladakh. Proc. Int. Snow Leopard Symp. 7:127-132.
10. Dang, H. (1967). The snow Leopard and its prey. Cheetal, 10 (1); 72-73.
11. Din, J.U. and Nawaz, M.A. (2011). Status of snow leopard and prey species in Torkhow valley, District Chitral, Pakistan. The Journal of Animal & Plant Sciences, 21(4): 836-840
12. Fox, J.L. and Chundawat, R.S. (1988). Observations of snow leopard stalking, killing, and feeding behavior. Mammalia 52(1):137-140.
13. Fox, J.L. (1989). A review of the status and ecology of the snow leopard (*Panthera uncia*). Unpublished Report. International Snow Leopard Trust, Seattle, Washington, 40 pages.
14. Fox, J.L. (1994). Snow leopard conservation in the wild - a comprehensive perspective on a low density and highly fragmented population. Pages 3-15 In: J. L., Fox, Du Jizeng (Eds.). Proceedings of the Seventh International Snow Leopard Symposium. International Snow Leopard Trust, Seattle, Washington. 331 pages.
15. Freeman, H. and Hutchins, M. (1978). Captive management of snow leopard cubs. Zool. Garten 48(1):49-62
16. Freeman, H. (1983). Behavior in adult pairs of captive snow leopards (*Panthera uncia*). Zoo. Biol. 2: 1 - 22.
17. Grzimek, B. (1972). Tierleben XIII:334- 336. Kinder Verlag.

18. Hast, M. (1987). Roaring and screaming Big cats Cat News : issue : 07#32.
19. Hemmer, H. (1972). *Uncia uncia*. Mammalian Species 20:1-5.
20. Heptner, V. and Sludskii, A.A. (1992). Mammals of the Soviet Union. Volume II, Part 2 Carnivora (Hyaenas and Cats). Smithsonian Institution Libraries and National Science Foundation, Washington DC. 748 pages.
21. Hunter, D.O. and Jackson, R. (1997). A range-wide model of potential snow leopard habitat. Pages 51-56 in: R. Jackson and A. Ahmad (editors). Proceedings of the 8th International Snow Leopard Symposium, Islamabad, November 1995. International Snow Leopard Trust, Seattle and WWF-Pakistan, Lahore.
22. Hussain, S. (2003). The status of the snow leopard in Pakistan and its conflict with local farmers. *Oryx* 37(1):26-3.
23. ISIS (International Species Information System) (2004). SPARKS 1.54: Single Population Analysis and Records Keeping System. Eagan, MN: International Species Information System. Available from: [www.isis.org](http://www.isis.org)
24. Jackson, R. M. (1996). Home range, movements and habitat use of snow leopard (*Uncia uncia*) in Nepal (Doctoral dissertation, University of London).
25. Jackson, R., Mallon, D., McCarthy, T., Chundaway, R.A. and Habib, B. (2008). *Panthera uncia*. The IUCN Red List of Threatened Species. Version 2014.2. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 24 October 2014.
26. Johnson, W. E and O'Brien, S. J. (1997). Phylogenetic Reconstruction of the Felidae Using 16S rRNA and NADH-5 Mitochondrial Genes. *Journal of Molecular Evolution*, 44(Suppl 1):S98–S116
27. Johnson, W. E., Eizirik, E., Pecon-Slattery, J., Murphy, W. J., Antunes, A., Teeling, E. and O'Brien, S. J. (2006). The late miocene radiation of modern felidae: A genetic assesment. *Science* 311: 73-77.
28. Kitchner, S.L., Meritt, D.A. and Rosenthal, M.A. (1975). Observations on the breeding and husbandry of snow leopards, *Panthera uncia*, at Lincoln Park Zoo, Chicago. *Intl. Zoo Yearb.* 15:212-217.
29. Mallon, D. (1984). The snow leopard in Mongolia. *International Pedigree Book of Snow Leopards* 4:3-10.
30. Mallon, D. (1985). The mammals of the Mongolian People's Republic. *Mammal Review* 15:71-102.
31. McCarthy, T.M. (2000). Ecology and conservation of snow leopards, Gobi brown bears and wild Bactrian camels in Mongolia. Ph.D. Dissertation, University of Massachusetts, Amherst. 133 pages.
32. McCarthy, T. M. and Chapron, G. (2003). Snow Leopard Survival Strategy. ISLT and SLN, Seattle, USA.
33. McCarthy, T. M., Allen, P. M., Fox, J., Chapron, G., Jackson, R. M., Mishra, C. and Theile, S. (2003). Snow leopard survival strategy. ISLT, Seattle.
34. McCarthy, T. M., Fuller, T. K., and Munkhtsog, B. (2005). Movements and activities of snow leopards in Southwestern Mongolia. *Biol. Conserv.* 124: 527-537.



35. Nowell, K. and Jackson, P. (1996). *Wild Cats. Status Survey and Conservation Action Plan*. IUCN/SSC Cat Specialist Group, Gland, Switzerland and Cambridge, UK.
36. Oli, M. K., Taylor, I. R., Rogers, D. M. E. (1993). Diet of the snow leopard (*Panthera uncia*) in the Annapurna Conservation Area, Nepal. *Journal of Zoology*, 231(3): 365–370.
37. Reiger, I. (1982). Breeding ounces, *Uncia uncia*. *International Pedigree Book of Snow leopards* 3:49-50.
38. Sadlier, R.M.F.S. (1966). Notes on reproduction in the larger Felidae. *Intl. Zoo. Yearb.* 6:184-187.
39. Schaller, G. B. (1977). *Mountain Monarchs: Wild Sheep and Goats of the Himalaya*. University Chicago Press, Chicago. 426 pages.
40. Schaller, G.B., Li Hong, Talipu, Junrang Ren, and Mingjiang Qiu. (1988). The snow leopard in Xinjiang. *Oryx* 22(4):197-204.
41. Schaller, G.B., Tserendeleg, J. and Amarsanaa, G. (1994). Observations on snow leopards in Mongolia. *Proc. Int. Snow Leopard Symp.* 7:33-42.
42. Sharma, S., Thapa, K., Chalise, M.K., Dutta, T., Bhatnagar, Y.V. and McCarthy, T.M. (2006). The snow leopard in Himalaya: a step towards their conservation by studying their distribution, marking, habitat selection, coexistence with other predators and wild prey–livestock–predator interaction. In *Conservation Biology in Asia*: 184–196
43. Srivastav, A., Nigam, P., Chakraborty, D. and Nayak, A.K. 2009. *Indian National Studbook of Snow Leopard (Uncia uncia)*. Wildlife Institute of India, Dehradun and Central Zoo Authority, New Delhi.
44. Wang, S. (1998). *China Red Data Book of Endangered Animals*. Beijing: Science Press, 132–135.
45. Wharton, D. and Freeman, H. (1988). The snow leopard *Panthera uncia*. A captive population under the Species Survival Plan. *Int. Zoo Yearb.* 27: 85-98. *Zoo. Soc. of London*
46. Wharton, D. and Mainka, S.A. (1997). Management and husbandry of the Snow leopard (*Uncia uncia*). *Int. Zoo Yearb.* 35: 139-147. *Zool. Soc. of London*

Historical population of Snow leopard (*Panthera uncia*)

Sl. No.	National Studbook No.	House Name Local ID Transponder No.	International Studbook No.	Sex	Birth date	Sire	Dam	Location	Date	Event
1.	00001	Vishna 780123 790025 790687	620	M	23-Jun-78	00099	00102	Helsinki Zurich Basel Zurich Eichberg Darjeeling	23-Jun-78 01-Jun-79 21-Sep-79 30-Jan-80 19-Jul-85 19-Mar-86 17-Jul-93	Birth Transfer Transfer Transfer Transfer Transfer Death
2.	00002	Persia 801404 121	697	F	23-Apr-80	00073	00081	San Anton Toledo Darjeeling	23-Apr-80 24-Oct-80 17-Jan-89 24-Aug-91	Birth Transfer Transfer Death
3.	00003	Kashi 840052	1005	F	26-Aug-84	00095	00100	Zurich Darjeeling	26-Aug-84 19-Mar-86 07-Sep-90	Birth Transfer Death
4.	00004	Hank 2293	1059	M	06-Jun-85	00096	00106	Littleroc Darjeeling	06-Jun-85 16-Jan-89 28-Aug-98	Birth Transfer Death
5.	00005	Quetta 900074	1474	F	23-May-90	00164	00166	Zurich Darjeeling	23-May-90 28-Jan-92 05-Sep-98	Birth Transfer Death
6.	00006	Quilla 900075	1473	F	23-May-90	00164	00166	Zurich Darjeeling	23-May-90 28-Jan-92 17-Sep-03	Birth Transfer Death
7.	00007	Quizil	1472	M	23-May-90	00164	00166	Zurich Darjeeling	23-May-90 28-Jan-92 23-Nov-00	Birth Transfer Death
8.	00008	Unkcub		F	01-Sep-91	Unk	Unk	Darjeeling	01-Sep-91 30-Sep-91	Birth Death
9.	00009	Ramba Darj8	1797	F	15-Oct-93	00004	00005	Darjeeling	15-Oct-93 21-May-06	Birth Death
10.	00010	Unnamed Darj12	1894	F	02-May-94	00004	00006	Darjeeling	02-May-94 04-May-94	Birth Death
11.	00011	Unnamed Darj11	1893	M	02-May-94	00004	00006	Darjeeling	02-May-94 03-May-94	Birth Death
12.	00012	Bina Uncub2	1896	F	18-May-95	00004	00006	Darjeeling	18-May-95 07-Nov-95	Birth Death
13.	00013	Biswa Darj16	1898	M	23-Oct-95	00004	00005	Darjeeling	23-Oct-95 12-Apr-96	Birth Death
14.	00014	Tyson 950196 000611163b	1850	M	08-Aug-95	00192	00176	Hunbstnd Darjeeling	08-Aug-95 28-Jan-00 14-Sep-13	Birth Transfer Death

Sl. No.	National Studbook No.	House Name Local ID Transponder No.	International Studbook No.	Sex	Birth date	Sire	Dam	Location	Date	Event
15.	00015	Urvasi Darj17	1899	F	23-Oct-95	00004	00005	Darjeeling Gangtok	23-Oct-95 11-Mar-05 29-Mar-07	Birth Transfer Death
16.	00016	Karan Darj15	1897	M	23-Oct-95	00004	00005	Darjeeling	23-Oct-95	Birth
17.	00017	Kush Darj19	1972	M	31-Oct-96	00007	00009	Darjeeling Gangtok Darjeeling	31-Oct-96 10-Mar-05 03-Apr-07	Birth Transfer Transfer
18.	00018	Luv Darj18	1971	M	31-Oct-96	00007	00009	Darjeeling	31-Oct-96 17-Oct-03	Birth Death
19.	00019	Menuka Darj21	2041	F	15-Dec-97	00004	00005	Darjeeling	15-Dec-97 25-May-98	Birth Death
20.	00020	Meghna Darj20	2040	F	15-Dec-97	00004	00005	Darjeeling	15-Dec-97 27-Aug-98	Birth Death
21.	00021	Kangha Darj22	2044	M	15-Dec-97	00004	00006	Darjeeling	15-Dec-97 16-Dec-97	Birth Death
22.	00022	Karish Darj24	2046	M	22-Mar-98	00004	00006	Darjeeling	22-Mar-98 24-Feb-11	Birth Death
23.	00023	Ravi Darj23	2045	M	22-Mar-98	00004	00006	Darjeeling	22-Mar-98 23-Mar-98	Birth Death
24.	00024	Uncub4		M	31-Mar-99	Unk	00015	Darjeeling	31-Mar-99 31-Mar-99	Birth Death
25.	00025	Raja Darj26	2180	M	29-Jun-99	00016	00009	Darjeeling	29-Jun-99 10-May-01	Birth Death
26.	00026	Rani Darj31 0006b72f94	2226	F	08-Apr-00	00007	00015	Darjeeling Nainital	08-Apr-00 29-Dec-04 21-Apr-10	Birth Transfer Death
27.	00027	Meeta Darj32	2227	F	~ 1993	Wild	Wild	India Darjeeling	17-May-00 17-May-00 24-Jun-00	Capture Transfer Death
28.	00028	Neeta Darj33	2228	F	~ 1997	Wild	Wild	India Darjeeling	17-May-00 17-May-00 11-Nov-10	Capture Transfer Death
29.	00029	Sapna Darj34	2229	F	19-Jul-00	00014	00006	Darjeeling Shimla	19-Jul-00 23-Dec-04 26-Jul-07	Birth Transfer Death
30.	00030	Bijay Darj37	2304	M	18-Mar-01	00014	00009	Darjeeling	18-Mar-01 27-May-01	Birth Death
31.	00031	Dolma Darj36	2303	F	18-Mar-01	00014	00009	Darjeeling	18-Mar-01 31-Jul-01	Birth Death
32.	00032	Jay Darj35	2302	M	18-Mar-01	00014	00009	Darjeeling	18-Mar-01 25-Sep-01	Birth Death
33.	00033	Lama	2305	M	08-May-01	00016	00028	Darjeeling	08-May-01 06-Jun-01	Birth Death
34.	00034	Prabhat Darj45	2405	M	08-Jul-02	00014	00015	Darjeeling	08-Jul-02	Birth

Sl. No.	National Studbook No.	House Name Local ID Transponder No.	International Studbook No.	Sex	Birth date	Sire	Dam	Location	Date	Event
35.	00035	Subash Darj44	2404	M	08-Jul-02	00014	00015	Darjeeling Shimla Darjeeling	08-Jul-02 23-Dec-04 30-Mar-13	Birth Transfer Transfer
36.	00036	Tilotoma Darj43	2403	F	19-Jun-02	00014	00009	Darjeeling	19-Jun-02 07-Nov-02	Birth Death
37.	00037	Ritu Darj47	2538	F	11-Mar-04	00016	00028	Darjeeling	11-Mar-04	Birth
38.	00038	Buddha Darj41	2401	M	19-Jun-02	00014	00009	Darjeeling	19-Jun-02	Birth
39.	00039	Dev Darj42 000617d41b	2402	M	19-Jun-02	00014	00009	Darjeeling Nainital	19-Jun-02 29-Dec-04 12-Mar-09	Birth Transfer Death
40.	00040	Tista Darj39	2399	F	29-Mar-02	00016	00028	Darjeeling	29-Mar-02 30-Sep-02	Birth Death
41.	00041	Torsa Darj40	2400	F	29-Mar-02	00016	00028	Darjeeling	29-Mar-02 30-Sep-02	Birth Death
42.	00042	Shibu Darj46	2537	M	26-May-03	00014	00015	Darjeeling	26-May-03 24-May-04	Birth Death
43.	00043	Rabi	2539	M	25-May-04	00014	00009	Darjeeling Gangtok	25-May-04 03-Apr-07 08-Dec-12	Birth Transfer Death
44.	00044	Yashmin Darj49 000611163b	2540	F	25-May-04	00014	00009	Darjeeling	25-May-04	Birth
45.	00045	Mallika Darj50 0000F8A18	2541	F	25-May-04	00014	00009	Darjeeling Gangtok	25-May-04 24-Jun-10	Birth Transfer
46.	00046	Akriti Darj52	2683	M	01-May-07	00016	00028	Darjeeling	01-May-07 08-Sep-07	Birth Death
47.	00047	Unnamed Darj53	2685	F	01-May-07	00016	00028	Darjeeling	01-May-07 07-Jun-07	Birth Death
48.	00048	Prakrit Darj52	2684	M	01-May-07	00016	00028	Darjeeling	01-May-07 06-Sep-07	Birth Death
49.	00049	Uncub5		F	18-Apr-09	00016	00028	Darjeeling	18-Apr-09 07-Sep-09	Birth Death
50.	00050	Uncub6		F	18-Apr-09	00016	00028	Darjeeling	18-Apr-09 29-Aug-09	Birth Death
51.	00051	Uncub7		F	18-Apr-09	00016	00028	Darjeeling	18-Apr-09 02-Aug-09	Birth Death
52.	00170	Unnamed Darj1	1209	?	29-May-87	00001	00003	Darjeeling	29-May-87 29-May-87	Birth Death
53.	00178	Usha Darj3	1371	F	20-May-89	00004	00002	Darjeeling	20-May-89 14-Oct-91	Birth Death
54.	00180	Purnima Darj4	1372	F	20-May-89	00004	00002	Darjeeling	20-May-89 21-Sep-89	Birth Death
55.	00194	Buta	1895	M	02-May-94	00004	00006	Darjeeling	02-May-94 24-May-94	Birth Death

Sl. No.	National Studbook No.	House Name Local ID Transponder No.	International Studbook No.	Sex	Birth date	Sire	Dam	Location	Date	Event
56.	00210	Unnamed		M	15-Feb-10	00016	00028	Darjeeling	15-Feb-10 18-Jun-10	Birth Death
57.	00211	Zima 96800000554284 6	2861	F	06-May-10	00207	00204	Lodz Darjeeling	06-May-10 06-Oct-13	Birth Transfer
58.	00212	Lavani 96800000554529 3	2862	F	06-May-10	00207	00204	Lodz Darjeeling	06-May-10 06-Oct-13	Birth Transfer
59.	00213	Kim	2846	F	20-May-10	00209	00208	Nurnberg Darjeeling	20-May-10 11-Oct-12	Birth Transfer
60.	00214	Unnamed		F	09-Sep-11	00034	00037	Darjeeling	09-Sep-11 14-Sep-11	Birth Death
61.	00215	Unnamed		F	09-Sep-11	00034	00037	Darjeeling	09-Sep-11 22-Nov-11	Birth Death
62.	00216	Rare	2994	F	19-Jun-12	00034	00037	Darjeeling	19-Jun-12	Birth
63.	00217	Unnamed		?	15-Oct-89	Unk	Unk	Darjeeling	15-Oct-89 04-Nov-93	Birth Death
64.	00218	Unnamed		?	31-Mar-99	00007	00015	Darjeeling	31-Mar-99 31-Mar-99	Birth Death
65.	00219	Unnamed		?	19-Oct-99	Unk	00015	Darjeeling	19-Oct-99 19-Oct-99	Birth Death
66.	00220	Unnamed		?	19-Jun-02	00014	00009	Darjeeling	19-Jun-02 21-Jun-02	Birth Death
67.	00221	Unnamed		?	26-May-03	00014	00006	Darjeeling	26-May-03 04-Jun-03	Birth Death
68.	00222	Unnamed		?	26-May-03	00014	00006	Darjeeling	26-May-03 09-Jul-03	Birth Death
69.	00223	Unnamed		?	28-Feb-04	Unk	00015	Darjeeling	28-Feb-04 28-Feb-04	Birth Death
70.	00224	Unnamed		?	28-Feb-04	Unk	00015	Darjeeling	28-Feb-04 28-Feb-04	Birth Death
71.	00225	Unnamed		?	28-Feb-04	Unk	00015	Darjeeling	28-Feb-04 01-Mar-04	Birth Death
72.	00226	Unnamed		?	11-Mar-04	00016	00028	Darjeeling	11-Mar-04 11-Mar-04	Birth Death
73.	00227	Sici 95600000197787 2		M	22-May-11	Unk	Unk	Jihlava Darjeeling	22-May-11 ???? 19-Jul-14	Birth Transfer Death
74.	00228	Shining		F	02-May-14	00038	00211	Darjeeling	02-May-14	Birth
75.	00229	Morning		F	02-May-14	00038	00211	Darjeeling	02-May-14	Birth
<b>Totals: 28.36.11 (75)</b>										

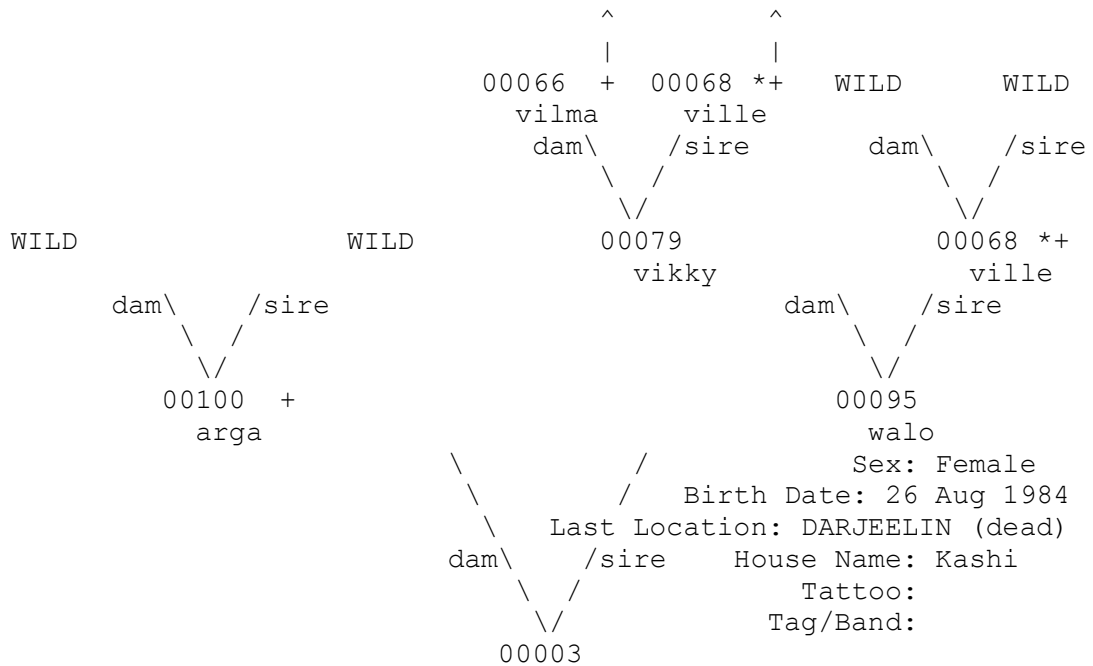
## Appendix II

### Living population of Snow leopard (*Panthera uncia*)

Sl. No.	National Studbook No.	House Name Local ID Transponder No.	International Studbook No.	Sex	Birth date	Sire	Dam	Location	Date	Event
<b>Darjeeling. Padmaja Naidu Himalayan Zoological Park</b>										
1.	00016	Karan Darj15	1897	M	23-Oct-95	00004	00005	Darjeeling	23-Oct-95	Birth
2.	00017	Kush Darj19	1972	M	31-Oct-96	00007	00009	Darjeeling Gangtok Darjeeling	31-Oct-96 10-Mar-05 03-Apr-07	Birth Transfer Transfer
3.	00034	Prabhat Darj45	2405	M	08-Jul-02	00014	00015	Darjeeling	08-Jul-02	Birth
4.	00035	Subash Darj44	2404	M	08-Jul-02	00014	00015	Darjeeling Shimla	08-Jul-02 23-Dec-04	Birth Transfer
5.	00037	Ritu Darj47	2538	F	11-Mar-04	00016	00028	Darjeeling	11-Mar-04	Birth
6.	00038	Buddha Darj41	2401	M	19-Jun-02	00014	00009	Darjeeling	19-Jun-02	Birth
7.	00044	Yashmin Darj49 000611163b	2540	F	25-May-04	00014	00009	Darjeeling	25-May-04	Birth
8.	00211	Zima 968000005542846	2861	F	06-May-10	00207	00204	Lodz Darjeeling	06-May-10 06-Oct-13	Birth Transfer
9.	00212	Lavani 968000005545293	2862	F	06-May-10	00207	00204	Lodz Darjeeling	06-May-10 06-Oct-13	Birth Transfer
10.	00213	Kim	2846	F	20-May-10	00209	00208	Numberg Darjeeling	20-May-10 11-Oct-12	Birth Transfer
11.	00216	Rare	2994	F	19-Jun-12	00034	00037	Darjeeling	19-Jun-12	Birth
12.	00228	Shining		F	02-May-14	00038	00211	Darjeeling	02-May-14	Birth
13.	00229	Morning		F	02-May-14	00038	00211	Darjeeling	02-May-14	Birth
<b>Totals: 5.8.0 (13)</b>										
<b>Gangtok. Himalayan Zoological Park</b>										
14.	00045	Mallika Darj50 0000F8A18	2541	F	25-May-04	00014	00009	Darjeeling Gangtok	25-May-04 24-Jun-10	Birth Transfer
<b>Totals: 0.1.0 (1)</b>										
<b>Totals: 5.9.0 (14)</b>										

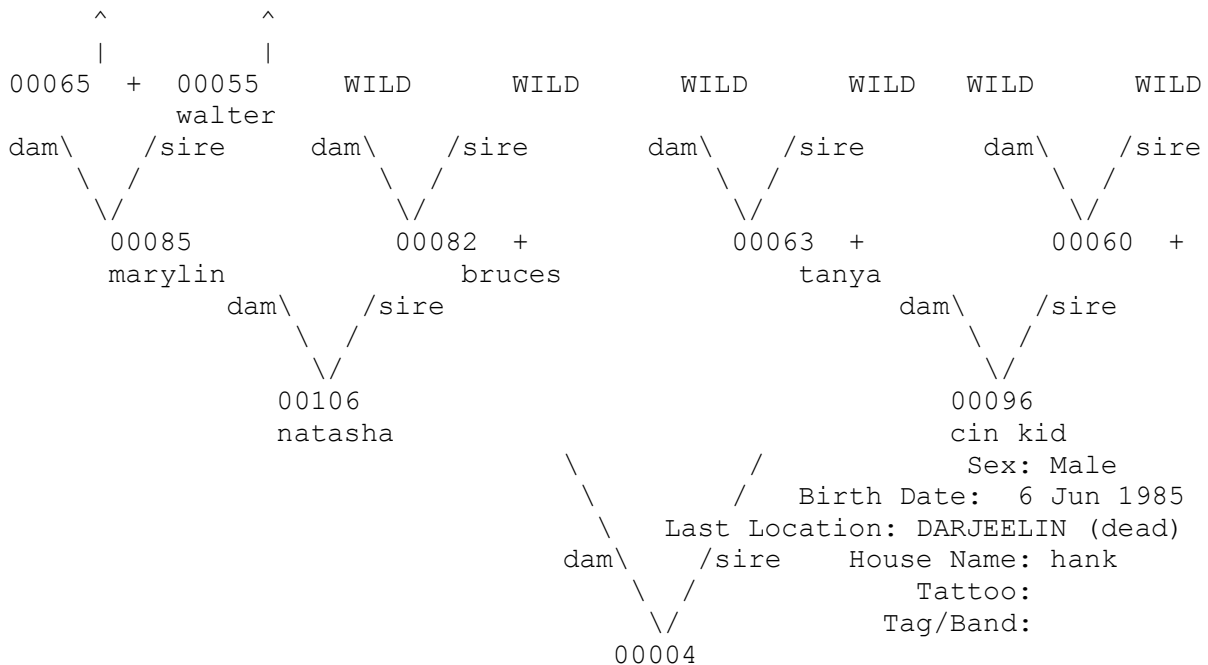


=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00003
   
=====



+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

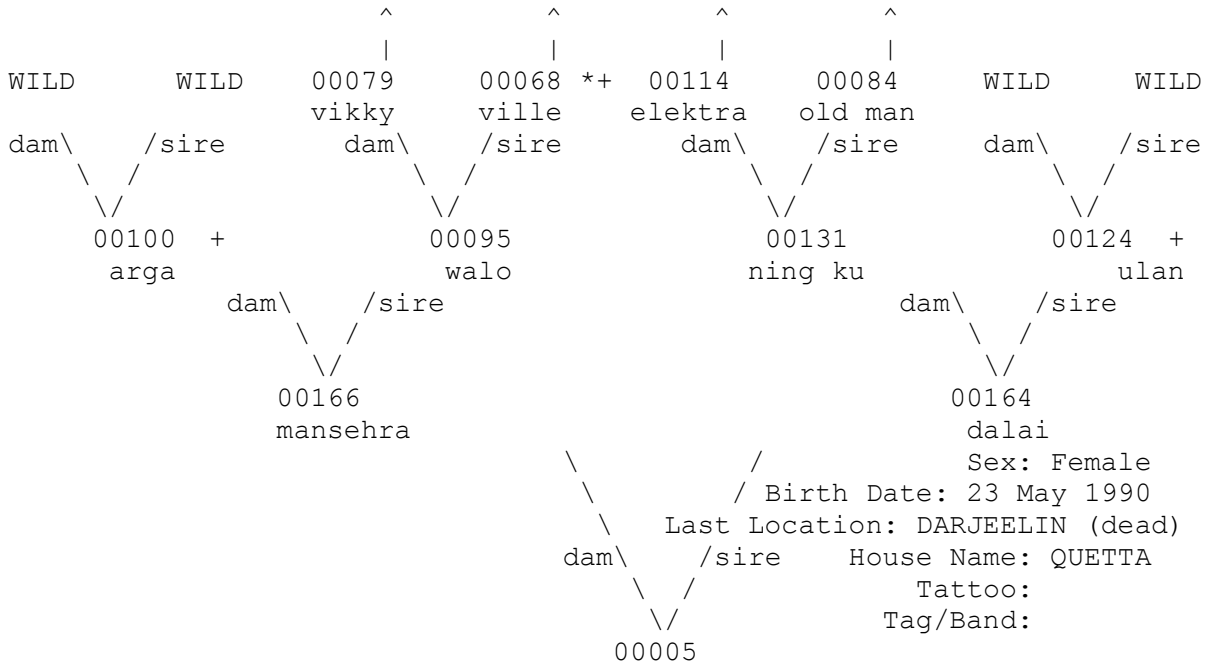
=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00004
   
=====



+ Wild-caught...
   
^ Pedigree continues beyond top of page...

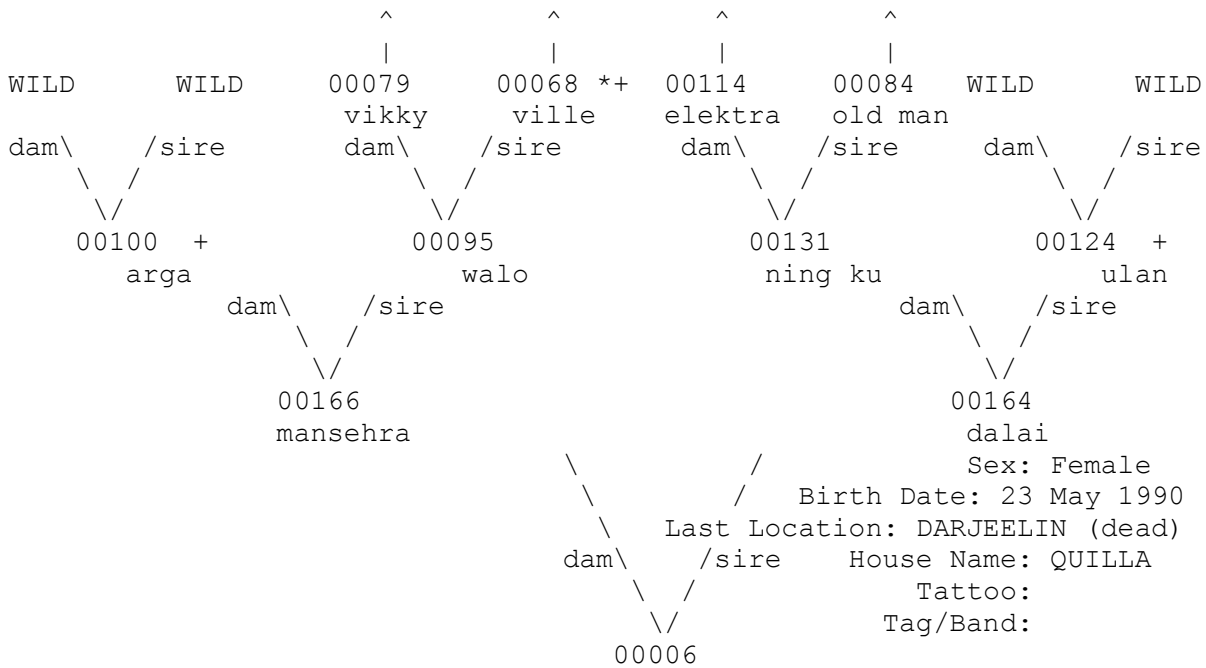


=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00005
   
=====



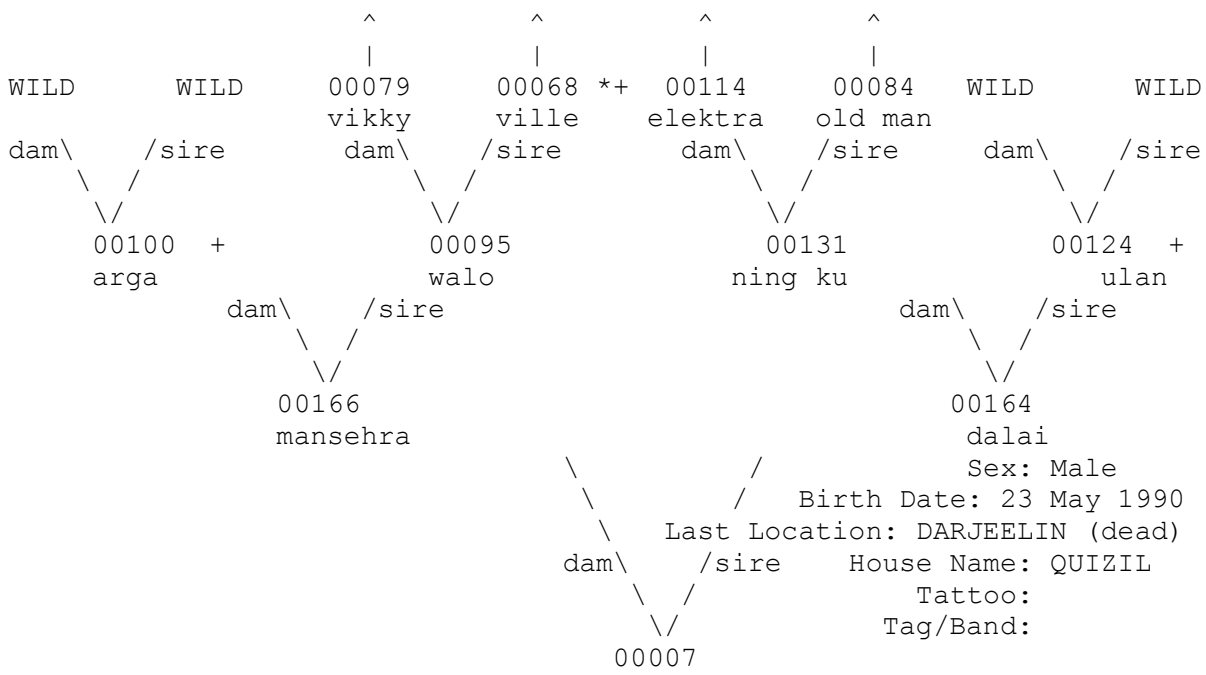
+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00006
   
=====



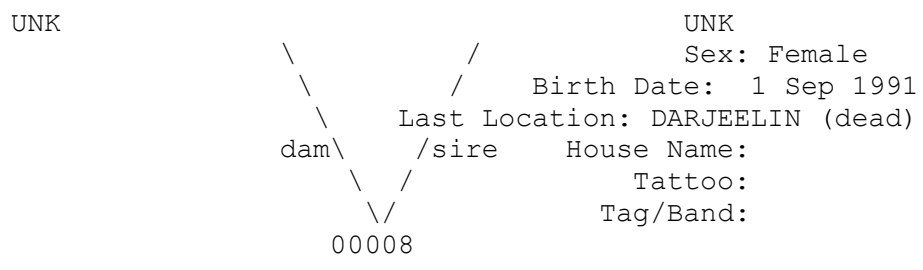
+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00007
   
=====



+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00008
   
=====



```

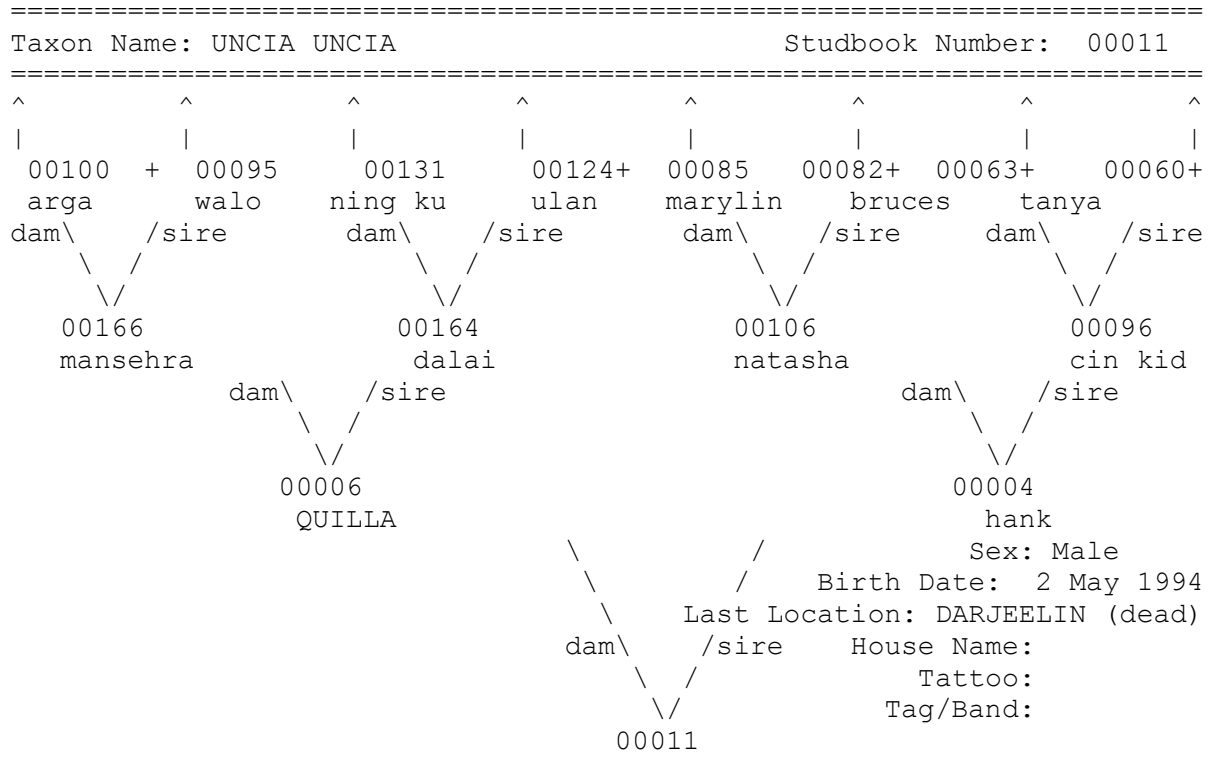
=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00009
=====
^               ^               ^               ^               ^               ^               ^               ^
|               |               |               |               |               |               |               |
00100 + 00095   00131   00124 + 00085   00082 + 00063 + 00060 +
arga    walo    ning ku   ulan    marylin   bruces   tanya
dam\    /sire   dam\    /sire   dam\    /sire   dam\    /sire   dam\    /sire
  \    /        \    /        \    /        \    /        \    /
   \  /          \  /          \  /          \  /          \  /
    00166        00164        00106        00096
   mansehra     dalai        natasha     cin kid
    dam\        /sire        dam\        /sire        dam\        /sire
      \    /          \    /          \    /          \    /
       \  /            \  /            \  /            \  /
        00005          00004
       QUETTA                hank
                               Sex: Female
                               Birth Date: 15 Oct 1993
                               Last Location: DARJEELIN (dead)
                               House Name: Ramba
                               Tattoo:
                               Tag/Band:
                               ^
                               |
                               00009
+ Wild-caught... * Appear more than once...
^ Pedigree continues beyond top of page...

```

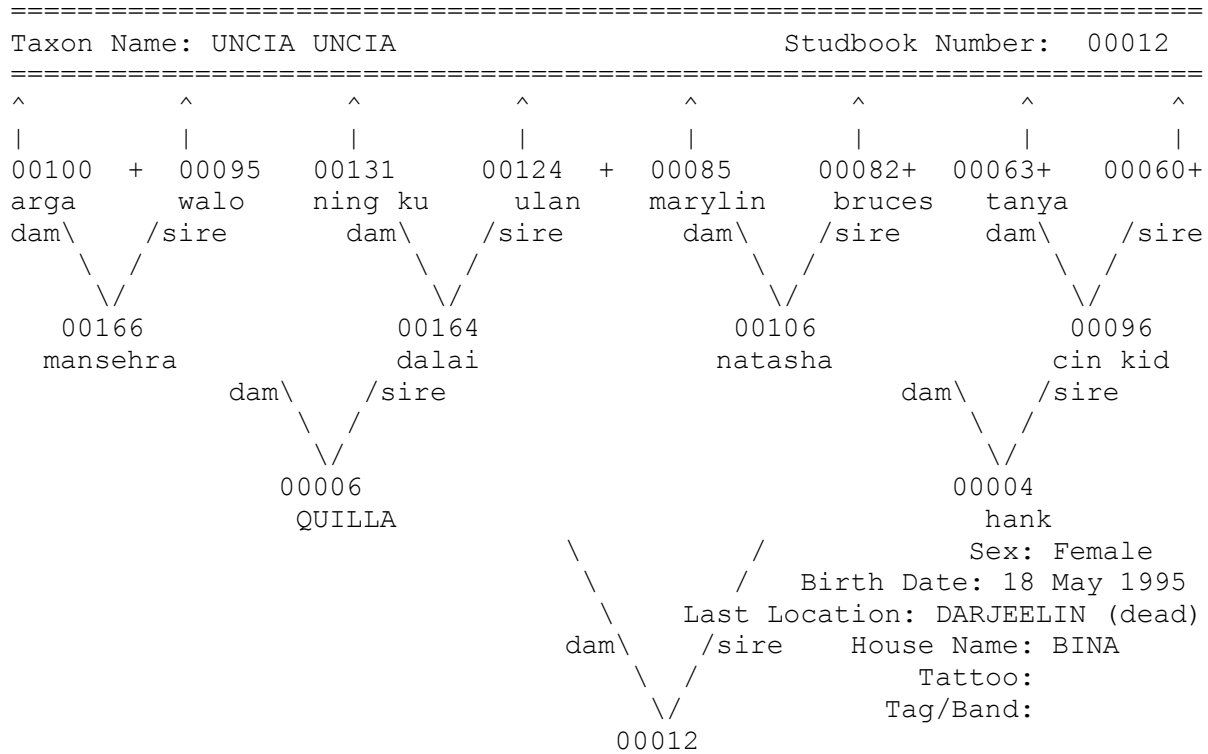
```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00010
=====
^               ^               ^               ^               ^               ^               ^               ^
|               |               |               |               |               |               |               |
00100 + 00095   00131   00124+ 00085   00082+ 00063+ 00060+
arga    walo    ning ku   ulan    marylin   bruces   tanya
dam\    /sire   dam\    /sire   dam\    /sire   dam\    /sire   dam\    /sire
  \    /        \    /        \    /        \    /        \    /
   \  /          \  /          \  /          \  /          \  /
    00166        00164        00106        00096
   mansehra     dalai        natasha     cin kid
    dam\        /sire        dam\        /sire        dam\        /sire
      \    /          \    /          \    /          \    /
       \  /            \  /            \  /            \  /
        00006          00004
       QUILLA                hank
                               Sex: Female
                               Birth Date: 2 May 1994
                               Last Location: DARJEELIN (dead)
                               House Name:
                               Tattoo:
                               Tag/Band:
                               ^
                               |
                               00010
+ Wild-caught... * Appear more than once...
^ Pedigree continues beyond top of page...

```



+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...



+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                                Studbook Number: 00013
=====
^                ^                ^                ^                ^                ^                ^                ^
|                |                |                |                |                |                |                |
00100 + 00095  00131  00124+  00085  00082+  00063+  00060+
arga    walo   ning ku  ulan   marylin  bruces   tanya   00060+
dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire
  \    /      \    /      \    /      \    /      \    /      \    /
  00166      00164      00106      00096
mansehra    dalai    natasha    cin kid
  dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire
    \    /      \    /      \    /      \    /
    00005      00004
  QUETTA      hank
              Sex: Male
              Birth Date: 23 Oct 1995
              Last Location: DARJEELIN (dead)
              House Name: Biswa
              Tattoo:
              Tag/Band:
              ^
              |
              00013
=====

```

+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                                Studbook Number: 00014
=====
^                ^                ^                ^                ^                ^                ^                ^
|                |                |                |                |                |                |                |
00118 * 00119 * 00109 *+ 00120 *+ 00149 * 00139 * 00160  00155
shanda  p.khan  ili     sabir   sita    orion   oda     ozon
dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire
  \    /      \    /      \    /      \    /      \    /      \    /
  00149 *      00139 *      00176 *      00175
sita          orion          tai          olf
  dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire
    \    /      \    /      \    /      \    /
    00176 *      00192
tai            irzig
              Sex: Male
              Birth Date: 8 Aug 1995
              Last Location: DARJEELIN (dead)
              House Name: Tyson
              Tattoo:
              Tag/Band:
              ^
              |
              00014
=====

```

+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00015
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00100 + 00095  00131  00124 + 00085  00082 + 00063 + 00060+
arga    walo   ning ku  ulan   marylin bruces tanya  cin kid
dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire
  \    /      \    /      \    /      \    /      \    /
  00166      00164      00106      00096
mansehra    dalai    natasha    cin kid
  dam\      /sire    dam\      /sire    dam\      /sire
  \    /      \    /      \    /      \    /
  00005      00004
QUETTA      hank
                Sex: Female
                Birth Date: 23 Oct 1995
                Last Location: GANGTOK (dead)
                House Name: URVASI
                Tattoo:
                Tag/Band:
  dam\      /sire
  \    /
  00015

+ Wild-caught... * Appear more than once...
^ Pedigree continues beyond top of page...

```

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00016
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00100 + 00095  00131  00124 + 00085  00082 + 00063+ 00060 +
arga    walo   ning ku  ulan   marylin bruces tanya  cin kid
dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire
  \    /      \    /      \    /      \    /      \    /
  00166      00164      00106      00096
mansehra    dalai    natasha    cin kid
  dam\      /sire    dam\      /sire    dam\      /sire
  \    /      \    /      \    /      \    /
  00005      00004
QUETTA      hank
                Sex: Male
                Birth Date: 23 Oct 1995
                Last Location: DARJEELIN
                House Name: Karan
                Tattoo:
                Tag/Band:
  dam\      /sire
  \    /
  00016

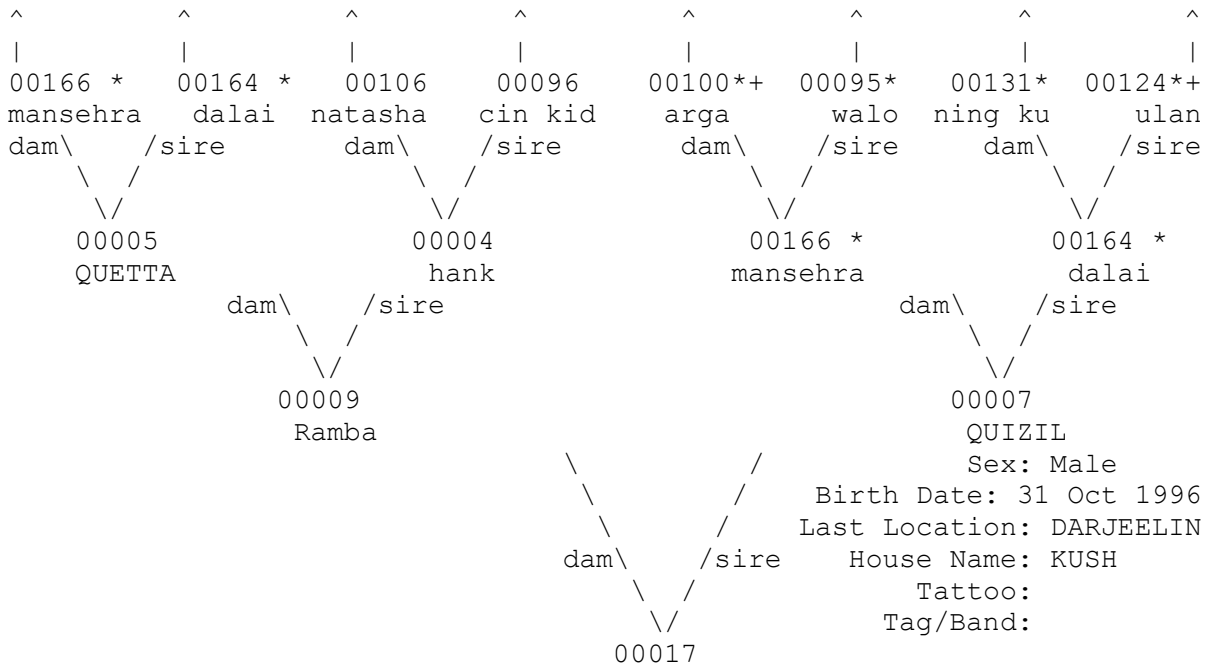
+ Wild-caught... * Appear more than once...
^ Pedigree continues beyond top of page...

```

=====

Taxon Name: UNCIA UNCIA

Studbook Number: 00017



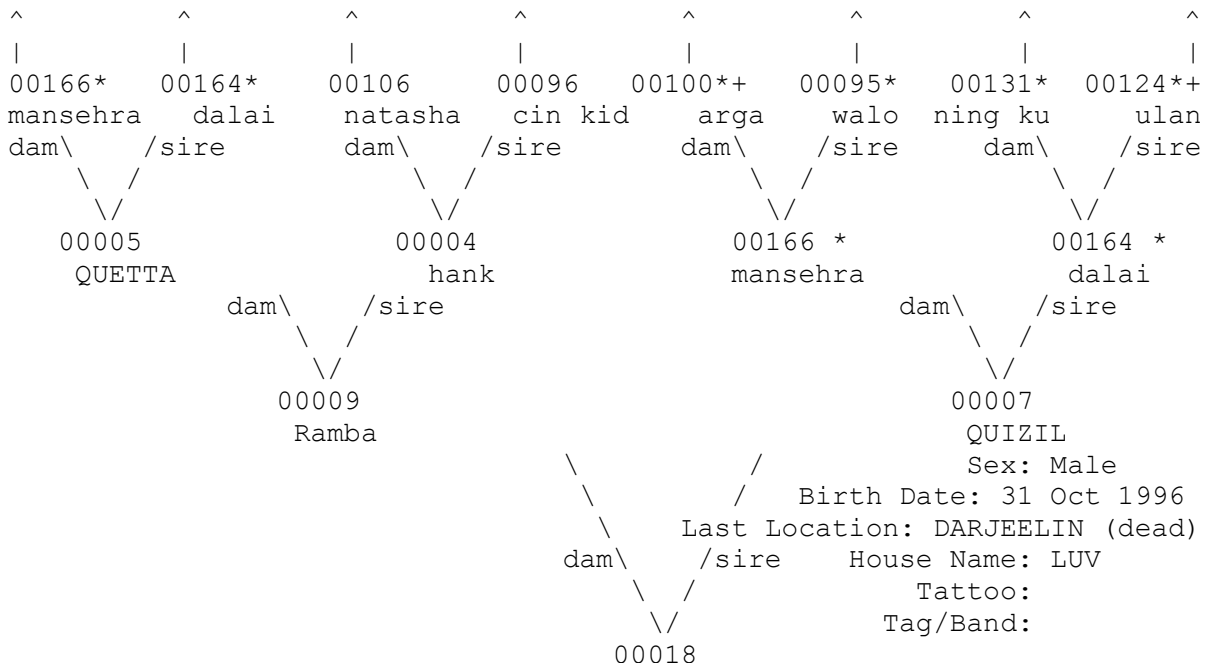
+ Wild-caught... \* Appear more than once...

^ Pedigree continues beyond top of page...

=====

Taxon Name: UNCIA UNCIA

Studbook Number: 00018



+ Wild-caught... \* Appear more than once...

^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00019
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00100 + 00095   00131   00124 + 00085   00082+ 00063+ 00060+
arga    walo    ning ku   ulan  marylin  bruces  tanya  dam\  /sire
dam\    /sire   dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire
  \    /        \    /        \    /        \    /        \    /
   \  /          \  /          \  /          \  /          \  /
    00166        00164        00106        00096
mansehra       dalai       natasha       cin kid
              dam\    /sire              dam\    /sire
              \    /                    \    /
              \  /                      \  /
               00005                    00004
               QUETTA                    hank
                                           Sex: Female
                                           Birth Date: 15 Dec 1997
                                           Last Location: DARJEELIN (dead)
                                           House Name: MENUKA
                                           Tattoo:
                                           Tag/Band:
                                           ^
                                           |
                                           00019
+ Wild-caught... * Appear more than once...
^ Pedigree continues beyond top of page...

```

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00020
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00100 + 00095   00131   00124+ 00085   00082+ 00063+ 00060+
arga    walo    ning ku   ulan  marylin  bruces  tanya  dam\  /sire
dam\    /sire   dam\    /sire  dam\    /sire  dam\    /sire  dam\    /sire
  \    /        \    /        \    /        \    /        \    /
   \  /          \  /          \  /          \  /          \  /
    00166        00164        00106        00096
mansehra       dalai       natasha       cin kid
              dam\    /sire              dam\    /sire
              \    /                    \    /
              \  /                      \  /
               00005                    00004
               QUETTA                    hank
                                           Sex: Female
                                           Birth Date: 15 Dec 1997
                                           Last Location: DARJEELIN (dead)
                                           House Name: MEGHNA
                                           Tattoo:
                                           Tag/Band:
                                           ^
                                           |
                                           00020
+ Wild-caught... * Appear more than once...
^ Pedigree continues beyond top of page...

```



```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00021
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00100+    00095    00131    00124+    00085    00082+    00063+    00060+
arga      walo     ning ku   ulan     marylin   bruces    tanya    /sire
dam\     /sire    dam\     /sire    dam\     /sire    dam\     /sire
  \     /        \     /        \     /        \     /        \     /
   \   /          \   /          \   /          \   /          \   /
    \ /            \ /            \ /            \ /            \ /
     00166        00164        00106        00096
    mansehra     dalai        natasha     cin kid
                dam\     /sire                dam\     /sire
                \     /                \     /
                \   /                \   /
                 \ /                \ /
                  00006                00004
                  QUILLA                hank
                                     Sex: Male
                                     Birth Date: 15 Dec 1997
                                     Last Location: DARJEELIN (dead)
                                     House Name: KANGHA
                                     Tattoo:
                                     Tag/Band:
                                     ^
                                     |
                                     00021
=====

```

+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00022
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00100    + 00095    00131    00124    + 00085    00082    + 00063+    00060+
arga      walo     ning ku   ulan     marylin   bruces    tanya    /sire
dam\     /sire    dam\     /sire    dam\     /sire    dam\     /sire
  \     /        \     /        \     /        \     /        \     /
   \   /          \   /          \   /          \   /          \   /
    \ /            \ /            \ /            \ /            \ /
     00166        00164        00106        00096
    mansehra     dalai        natasha     cin kid
                dam\     /sire                dam\     /sire
                \     /                \     /
                \   /                \   /
                 \ /                \ /
                  00006                00004
                  QUILLA                hank
                                     Sex: Male
                                     Birth Date: 22 Mar 1998
                                     Last Location: DARJEELIN (dead)
                                     House Name: KARISH
                                     Tattoo:
                                     Tag/Band:
                                     ^
                                     |
                                     00022
=====

```

+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                      Studbook Number: 00023
=====
^          ^          ^          ^          ^          ^          ^          ^
|          |          |          |          |          |          |          |
00100    + 00095    00131    00124    + 00085    00082    + 00063+    00060+
arga      walo      ning ku    ulan    marylin  bruces    tanya    /sire
dam\     /sire      dam\     /sire      dam\     /sire      dam\     /sire
  \     /          \     /          \     /          \     /
   \   /            \   /            \   /            \   /
    00166          00164          00106          00096
mansehra        dalai        natasha        cin kid
              dam\     /sire              dam\     /sire
              \     /                    \     /
              00006                    00004
              QUILLA                      hank
                                           Sex: Male
                                           Birth Date: 22 Mar 1998
                                           Last Location: DARJEELIN (dead)
                                           House Name: RAVI
                                           Tattoo:
                                           Tag/Band:
                                           /
                                           /
dam\     /sire
  \     /
   \   /
    00023
=====

```

+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                      Studbook Number: 00024
=====
^          ^          ^          ^
|          |          |          |
00166    00164    00106    00096
mansehra dalai    natasha  cin kid
dam\     /sire      dam\     /sire
  \     /          \     /
   \   /            \   /
    00005          00004
    QUETTA        hank
              dam\     /sire
              \     /
              00015
              URVASI
                                           UNK
                                           Sex: Male
                                           Birth Date: 31 Mar 1999
                                           Last Location: DARJEELIN (dead)
                                           House Name:
                                           Tattoo:
                                           Tag/Band:
                                           /
                                           /
dam\     /sire
  \     /
   \   /
    00024
=====

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00025
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166*    00164*    00106*    00096*    00166*    00164*    00106*    00096*
mansehra  dalai    natasha  cin kid  mansehra  dalai    natasha  cin kid
dam\      /sire    dam\      /sire    dam\      /sire    dam\      /sire
  \      /      \      /      \      /      \      /
   \    /        \    /        \    /        \    /
    \  /          \  /          \  /          \  /
     \ /            \ /            \ /            \ /
      00005 *        00004 *        00005 *        00004 *
      QUETTA         hank          QUETTA         hank
        \          /          \          /          \          /
         \        /            \        /            \        /
          \      /              \      /              \      /
           \    /                \    /                \    /
            \  /                  \  /                  \  /
             \ /                    \ /                    \ /
              00009                 00016
              Ramba                  Karan
                                     Sex: Male
                                     Birth Date: 29 Jun 1999
                                     Last Location: DARJEELIN (dead)
                                     House Name: RAJA
                                     Tattoo:
                                     Tag/Band:
                                     ^
                                     |
                                     00025

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00026
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166*    00164 *    00106    00096    00100*+ 00095*    00131*    00124*+
mansehra  dalai    natasha  cin kid  arga     walo     ning ku  ulan
dam\      /sire    dam\      /sire    dam\      /sire    dam\      /sire
  \      /      \      /      \      /      \      /      \      /
   \    /        \    /        \    /        \    /        \    /
    \  /          \  /          \  /          \  /          \  /
     \ /            \ /            \ /            \ /            \ /
      00005         00004         00166 *        00164 *
      QUETTA         hank          mansehra        dalai
        \          /          \          /          \          /
         \        /            \        /            \        /
          \      /              \      /              \      /
           \    /                \    /                \    /
            \  /                  \  /                  \  /
             \ /                    \ /                    \ /
              00015                 00007
              URVASI                 QUIZIL
                                     Sex: Female
                                     Birth Date: 8 Apr 2000
                                     Last Location: NAINITAL (dead)
                                     House Name: RANI
                                     Tattoo:
                                     Tag/Band:
                                     ^
                                     |
                                     00026

```

+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...



```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00030
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166      00164      00106      00096      00149*    00139*    00176*    00175
mansehra   dalai     natasha   cin kid   sita      orion     tai       olf
dam\       /sire     dam\       /sire     dam\       /sire     dam\       /sire
  \       /         \       /         \       /         \       /
   \     /           \     /           \     /           \     /
    \   /             \   /             \   /             \   /
     \ /               \ /               \ /               \ /
      V                 V                 V                 V
00005      00004      00176 *    00192
QUETTA     hank      tai         irzig
  \       /         \       /         \       /         \       /
   \     /           \     /           \     /           \     /
    \   /             \   /             \   /           \   /
     \ /               \ /               \ /             \ /
      V                 V                 V                 V
00009      00014
Ramba     Tyson
           Sex: Male
           Birth Date: 18 Mar 2001
           Last Location: DARJEELIN (dead)
           House Name: BIJAY
           Tattoo:
           Tag/Band:
           ^
           |
           V
00030

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00031
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166      00164      00106      00096      00149 *    00139 *    00176 *    00175
mansehra   dalai     natasha   cin kid   sita      orion     tai       olf
dam\       /sire     dam\       /sire     dam\       /sire     dam\       /sire
  \       /         \       /         \       /         \       /
   \     /           \     /           \     /           \     /
    \   /             \   /             \   /             \   /
     \ /               \ /               \ /               \ /
      V                 V                 V                 V
00005      00004      00176 *    00192
QUETTA     hank      tai         irzig
  \       /         \       /         \       /         \       /
   \     /           \     /           \     /           \     /
    \   /             \   /             \   /           \   /
     \ /               \ /               \ /             \ /
      V                 V                 V                 V
00009      00014
Ramba     Tyson
           Sex: Female
           Birth Date: 18 Mar 2001
           Last Location: DARJEELIN (dead)
           House Name: DOLMA
           Tattoo:
           Tag/Band:
           ^
           |
           V
00031

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                                Studbook Number: 00032
=====
^         ^         ^         ^         ^         ^         ^         ^
|         |         |         |         |         |         |         |
00166    00164    00106    00096    00149 *   00139 *   00176 *   00175
mansehra dalai    natasha  cin kid   sita      orion     tai       olf
dam\     /sire    dam\     /sire    dam\     /sire    dam\     /sire
 \     /          \     /          \     /          \     /
  00005          00004          00176 *          00192
  QUETTA        hank          tai              irzig
          dam\     /sire          dam\     /sire
           \     /              \     /
            00009              00014
            Ramba              Tyson
                                 Sex: Male
                                 Birth Date: 18 Mar 2001
                                 Last Location: DARJEELIN (dead)
                                 House Name: JAY
                                 Tattoo:
                                 Tag/Band:
           \     /              \     /
            dam\     /sire      dam\     /sire
             \     /              \     /
              00032              00032
=====

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                                Studbook Number: 00033
=====
^         ^         ^         ^
|         |         |         |
00166    00164    00106    00096
mansehra dalai    natasha  cin kid
dam\     /sire    dam\     /sire
 \     /          \     /
  00005          00004
  QUETTA        hank
          dam\     /sire          dam\     /sire
           \     /              \     /
            00028 +          00016
            NEETA        Karan
                                 Sex: Male
                                 Birth Date: 8 May 2001
                                 Last Location: DARJEELIN (dead)
                                 House Name: LAMA
                                 Tattoo:
                                 Tag/Band:
           \     /              \     /
            dam\     /sire      dam\     /sire
             \     /              \     /
              00033              00033
=====

```

+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00034
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166      00164      00106      00096      00149 *   00139 *   00176 *   00175
mansehra   dalai     natasha   cin kid   sita        orion     tai        olf
dam\       /sire     dam\       /sire     dam\       /sire     dam\       /sire
  \       /         \       /         \       /         \       /
   \     /           \     /           \     /           \     /
    \   /             \   /             \   /             \   /
     \ /               \ /               \ /               \ /
      00005             00004             00176 *           00192
      QUETTA             hank             tai               irzig
                                     dam\       /sire     dam\       /sire
                                     \       /         \       /
                                     \     /           \     /
                                      \   /             \   /
                                       \ /               \ /
                                        00015             00014
                                        URVASI             Tyson
                                                                Sex: Male
                                                                Birth Date: 8 Jul 2002
                                                                Last Location: DARJEELIN
                                                                House Name: PRABHAT
                                                                Tattoo:
                                                                Tag/Band:
                                     dam\       /sire
                                     \       /
                                     \     /
                                      \   /
                                       \ /
                                        00034
=====

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00035
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166      00164      00106      00096      00149*   00139*   00176*   00175
mansehra   dalai     natasha   cin kid   sita        orion     tai        olf
dam\       /sire     dam\       /sire     dam\       /sire     dam\       /sire
  \       /         \       /         \       /         \       /
   \     /           \     /           \     /           \     /
    \   /             \   /             \   /             \   /
     \ /               \ /               \ /               \ /
      00005             00004             00176 *           00192
      QUETTA             hank             tai               irzig
                                     dam\       /sire     dam\       /sire
                                     \       /         \       /
                                     \     /           \     /
                                      \   /             \   /
                                       \ /               \ /
                                        00015             00014
                                        URVASI             Tyson
                                                                Sex: Male
                                                                Birth Date: 8 Jul 2002
                                                                Last Location: DARJEELIN
                                                                House Name: SUBASH
                                                                Tattoo:
                                                                Tag/Band:
                                     dam\       /sire
                                     \       /
                                     \     /
                                      \   /
                                       \ /
                                        00035
=====

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00036
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166      00164      00106      00096      00149 *    00139 *    00176 *    00175
mansehra  dalai      natasha   cin kid   sita        orion      tai        olf
dam\      /sire      dam\      /sire      dam\      /sire      dam\      /sire
  \      /          \      /          \      /          \      /
   \    /            \    /            \    /            \    /
    \  /              \  /              \  /              \  /
     \ /                \ /                \ /                \ /
      00005              00004              00176 *              00192
      QUETTA              hank              tai                  irzig
                                     dam\      /sire      dam\      /sire
                                     \      /          \      /
                                      \    /            \    /
                                       \  /              \  /
                                        \ /                \ /
                                         00009              00014
                                         Ramba                  Tyson
                                                                Sex: Female
                                                                Birth Date: 19 Jun 2002
                                                                Last Location: DARJEELIN (dead)
                                                                House Name: TILOTOMA
                                                                Tattoo:
                                                                Tag/Band:
                                     dam\      /sire
                                     \      /
                                      \    /
                                       \  /
                                        \ /
                                         00036

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00037
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166      00164      00106      00096
mansehra  dalai      natasha   cin kid
dam\      /sire      dam\      /sire
  \      /          \      /
   \    /            \    /
    \  /              \  /
     \ /                \ /
      00005              00004
      QUETTA              hank
                                     dam\      /sire      dam\      /sire
                                     \      /          \      /
                                      \    /            \    /
                                       \  /              \  /
                                        \ /                \ /
                                         00028 +              00016
                                         NEETA                  Karan
                                                                Sex: Female
                                                                Birth Date: 11 Mar 2004
                                                                Last Location: DARJEELIN
                                                                House Name: RITU
                                                                Tattoo:
                                                                Tag/Band:
                                     dam\      /sire
                                     \      /
                                      \    /
                                       \  /
                                        \ /
                                         00037

```

+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...



```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00038
=====
^         ^         ^         ^         ^         ^         ^         ^
|         |         |         |         |         |         |         |
00166     00164     00106     00096     00149 *    00139 *    00176 *    00175
mansehra  dalai    natasha  cin kid   sita      orion     tai       olf
dam\      /sire    dam\      /sire    dam\      /sire    dam\      /sire
  \      /        \      /        \      /        \      /
   \    /          \    /          \    /          \    /
    \  /            \  /            \  /            \  /
     \ /              \ /              \ /              \ /
      V                V                V                V
00005          00004          00176 *          00192
QUETTA        hank          tai              irzig
  dam\      /sire    dam\      /sire    dam\      /sire
   \      /        \      /        \      /        \      /
    \    /          \    /          \    /          \    /
     \  /            \  /            \  /            \  /
      V                V                V                V
00009          00014
Ramba          Tyson
                Sex: Male
                Birth Date: 19 Jun 2002
                Last Location: DARJEELIN
                House Name: BUDDHA
                Tattoo:
                Tag/Band:
                ^
                |
                dam\      /sire
                 \      /
                  \    /
                   \  /
                    V
                   00038

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

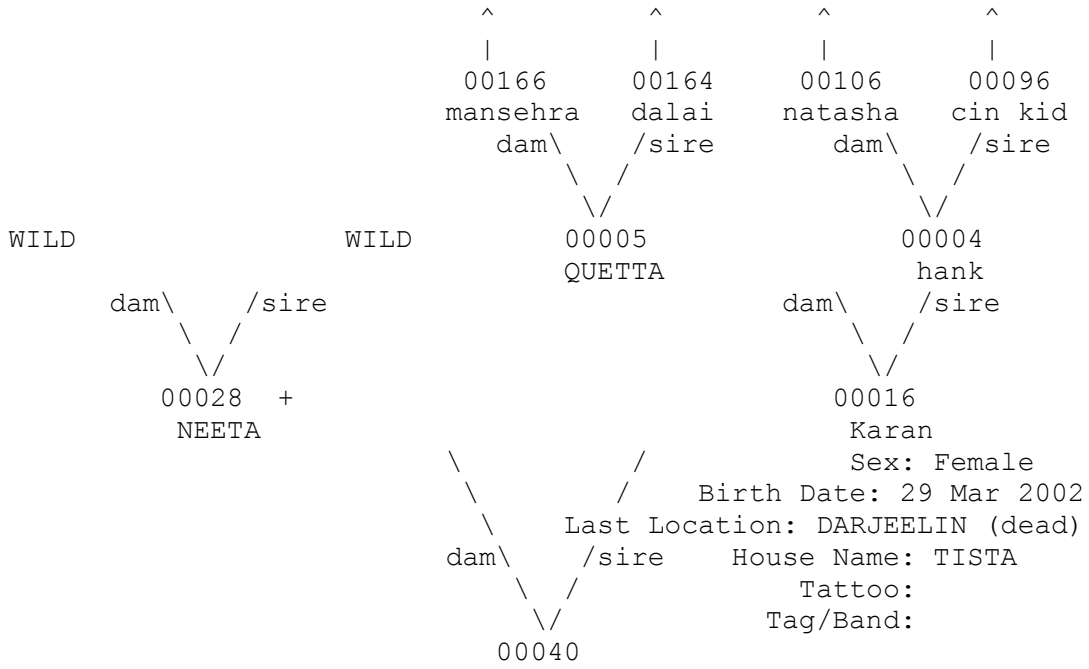
```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00039
=====
^         ^         ^         ^         ^         ^         ^         ^
|         |         |         |         |         |         |         |
00166     00164     00106     00096     00149 *    00139 *    00176 *    00175
mansehra  dalai    natasha  cin kid   sita      orion     tai       olf
dam\      /sire    dam\      /sire    dam\      /sire    dam\      /sire
  \      /        \      /        \      /        \      /
   \    /          \    /          \    /          \    /
    \  /            \  /            \  /            \  /
     \ /              \ /              \ /              \ /
      V                V                V                V
00005          00004          00176 *          00192
QUETTA        hank          tai              irzig
  dam\      /sire    dam\      /sire    dam\      /sire
   \      /        \      /        \      /        \      /
    \    /          \    /          \    /          \    /
     \  /            \  /            \  /            \  /
      V                V                V                V
00009          00014
Ramba          Tyson
                Sex: Male
                Birth Date: 19 Jun 2002
                Last Location: NAINITAL (dead)
                House Name: DEV
                Tattoo:
                Tag/Band:
                ^
                |
                dam\      /sire
                 \      /
                  \    /
                   \  /
                    V
                   00039

```

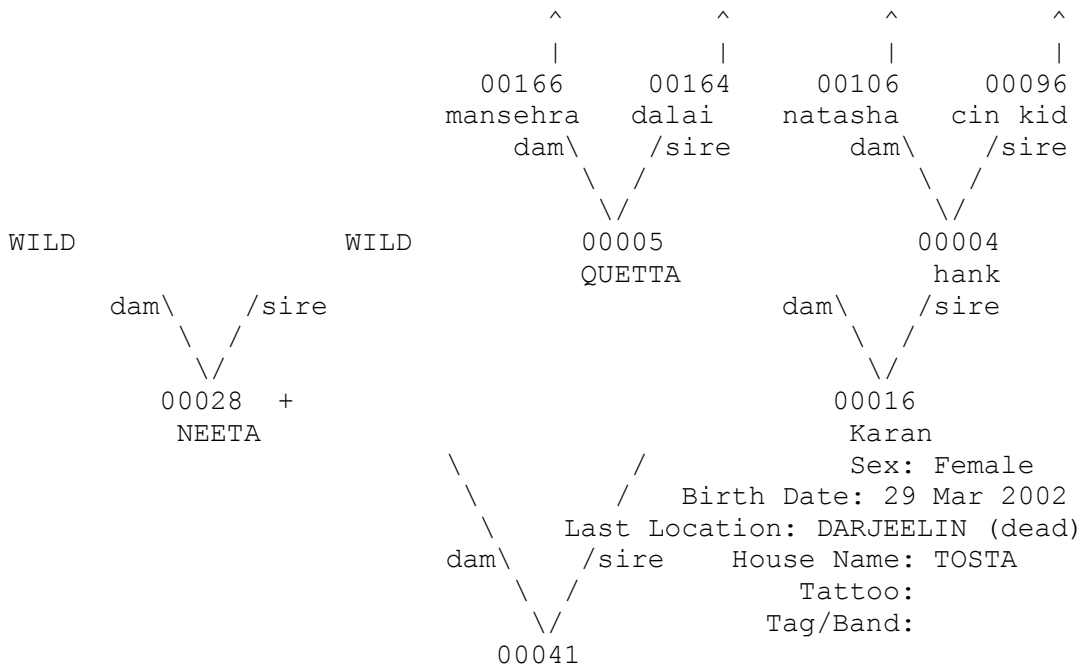
\* Appear more than once...  
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA
   
Studbook Number: 00040
   
=====



+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA
   
Studbook Number: 00041
   
=====



+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00042
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166      00164      00106      00096      00149*    00139*    00176*    00175
mansehra   dalai     natasha   cin kid   sita       orion     tai       olf
dam\       /sire     dam\       /sire     dam\       /sire     dam\       /sire
  \       /         \       /         \       /         \       /
   \     /           \     /           \     /           \     /
    \   /             \   /             \   /             \   /
     \ /               \ /               \ /               \ /
      00005             00004             00176 *           00192
      QUETTA             hank             tai             irzig
                                dam\       /sire           dam\       /sire
                                \       /             \       /
                                \     /             \     /
                                 \   /             \   /
                                  \ /               \ /
                                   00015           00014
                                   URVASI         Tyson
                                                Sex: Male
                                                Birth Date: 26 May 2003
                                                Last Location: DARJEELIN (dead)
                                dam\       /sire       House Name: Shibu
                                \       /             Tattoo:
                                \     /             Tag/Band:
                                 \   /
                                  \ /
                                   00042

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00043
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166      00164      00106      00096      00149*    00139*    00176*    00175
mansehra   dalai     natasha   cin kid   sita       orion     tai       olf
dam\       /sire     dam\       /sire     dam\       /sire     dam\       /sire
  \       /         \       /         \       /         \       /
   \     /           \     /           \     /           \     /
    \   /             \   /             \   /             \   /
     \ /               \ /               \ /               \ /
      00005             00004             00176 *           00192
      QUETTA             hank             tai             irzig
                                dam\       /sire           dam\       /sire
                                \       /             \       /
                                \     /             \     /
                                 \   /             \   /
                                  \ /               \ /
                                   00009           00014
                                   Ramba         Tyson
                                                Sex: Male
                                                Birth Date: 25 May 2004
                                                Last Location: GANGTOK (dead)
                                dam\       /sire       House Name: RABI
                                \       /             Tattoo:
                                \     /             Tag/Band:
                                 \   /
                                  \ /
                                   00043

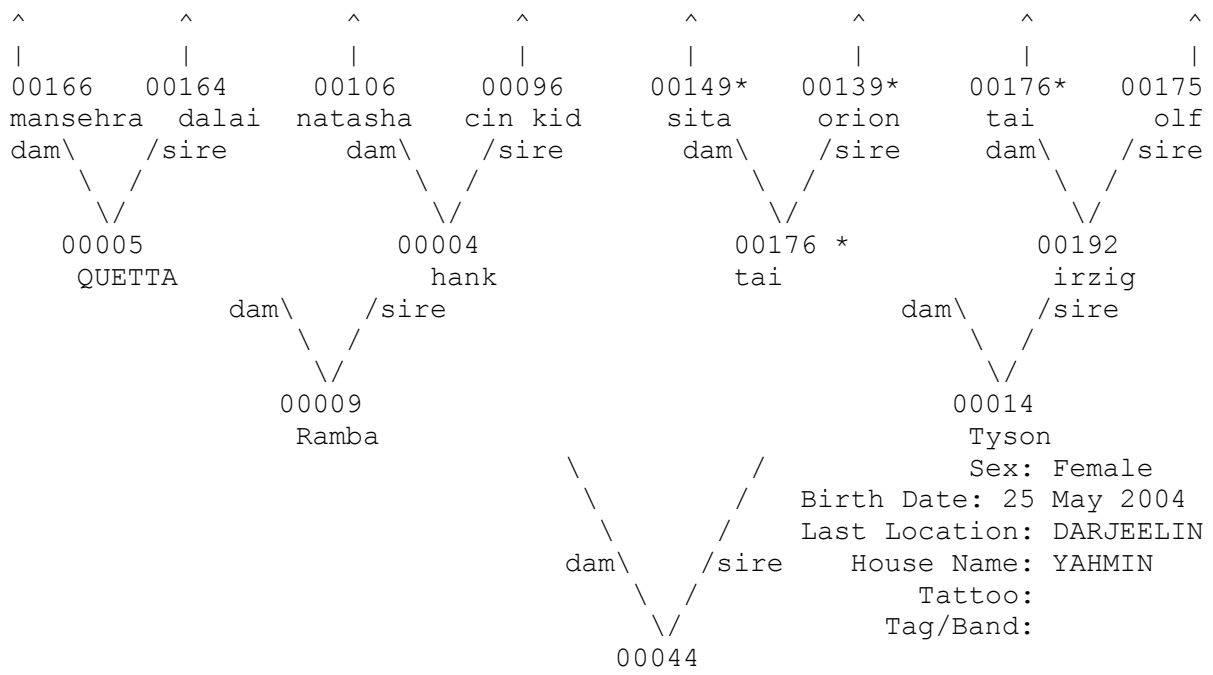
```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

=====

Taxon Name: UNCIA UNCIA Studbook Number: 00044

=====

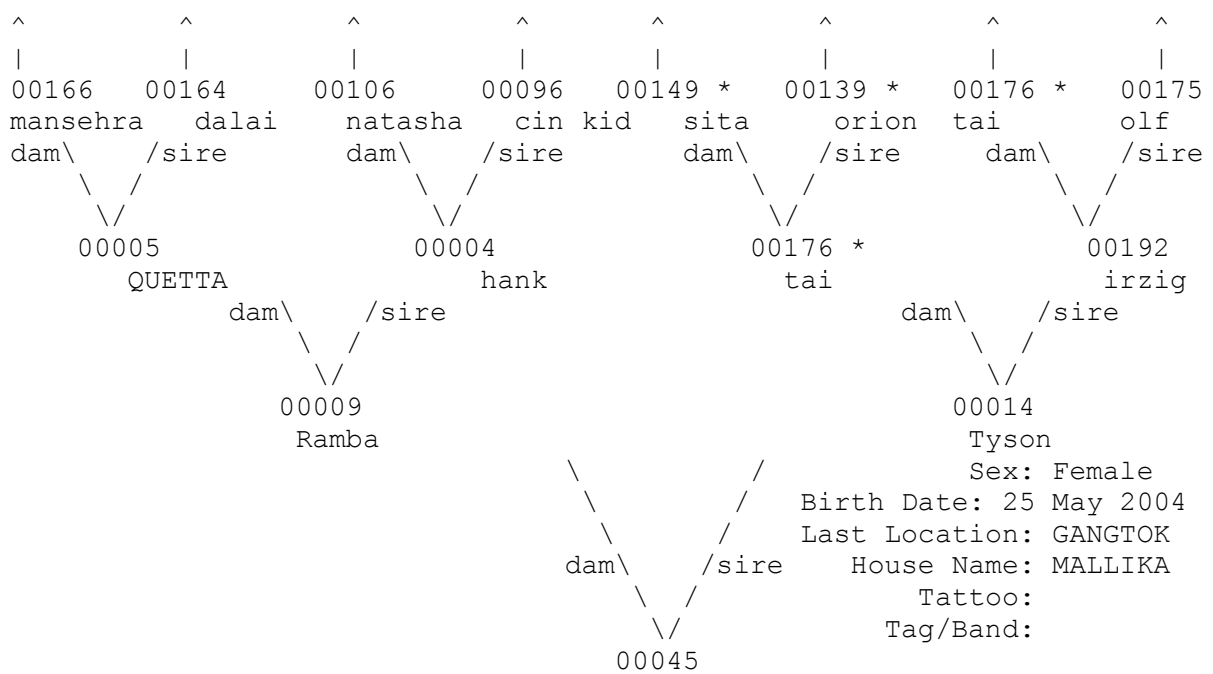


\* Appear more than once...  
 ^ Pedigree continues beyond top of page...

=====

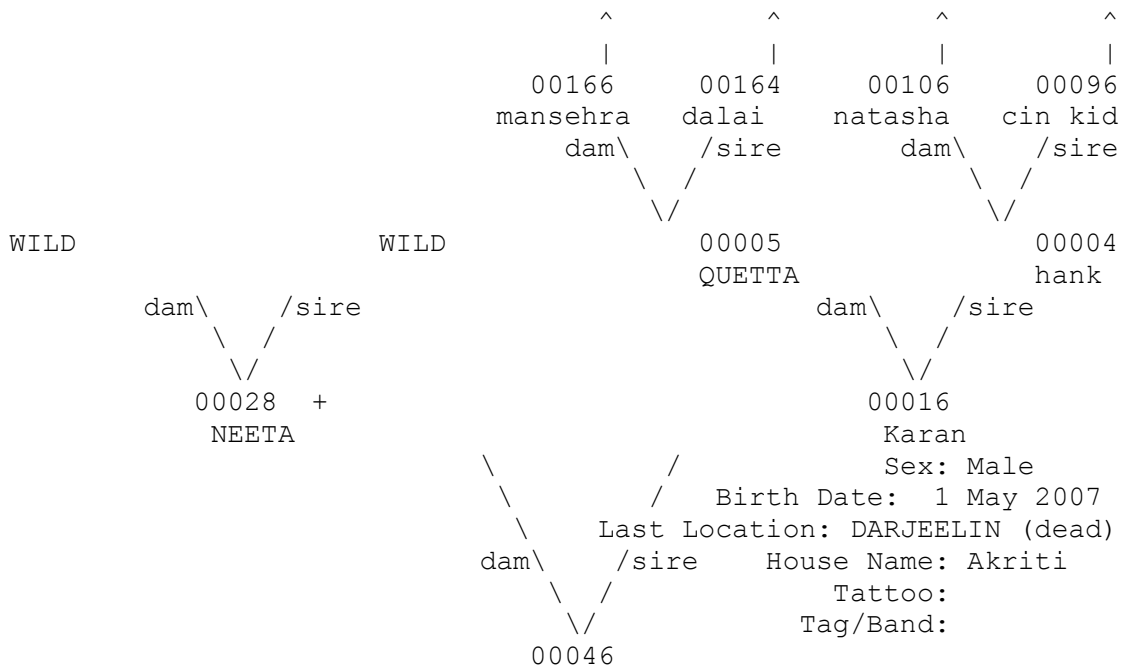
Taxon Name: UNCIA UNCIA Studbook Number: 00045

=====



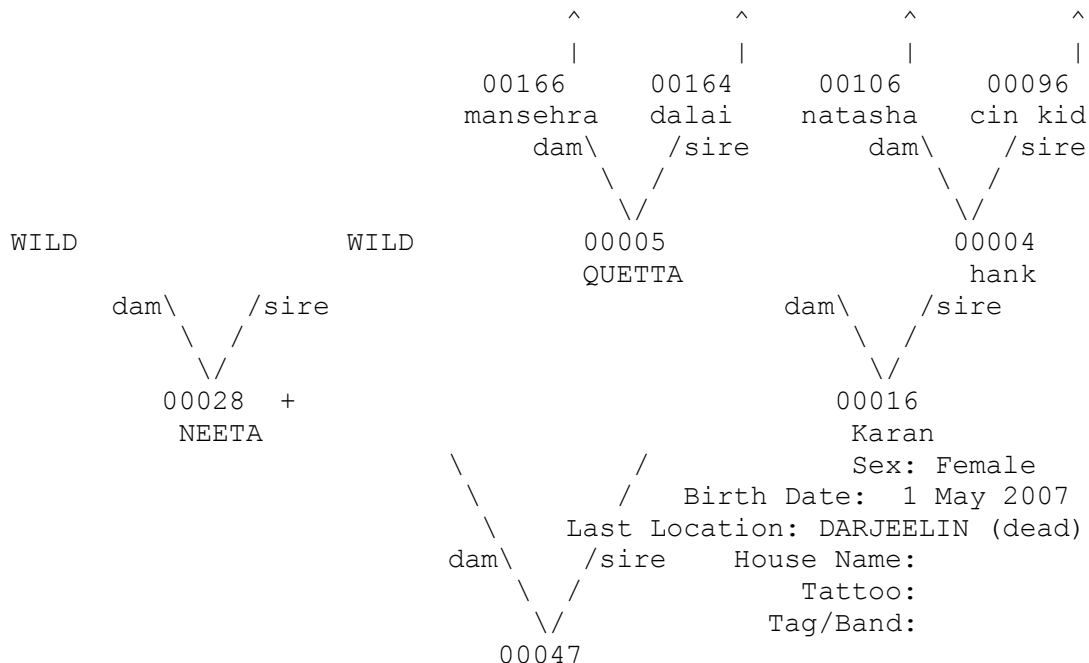
\* Appear more than once...  
 ^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00046
   
=====



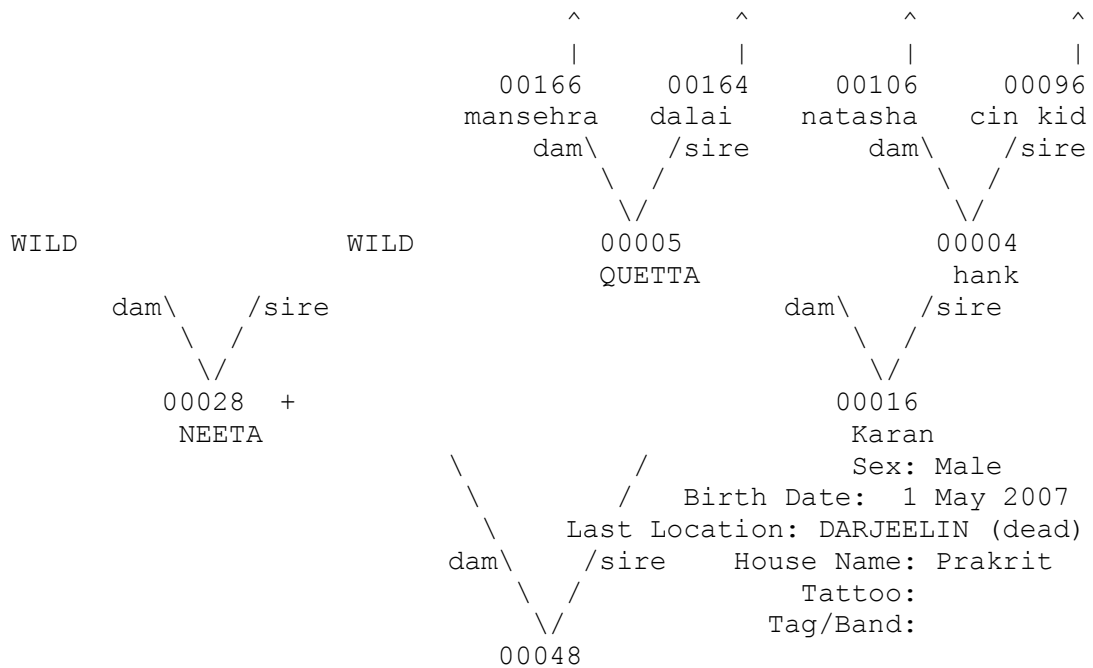
+ Wild-caught... \* Appear more than once...  
 ^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00047
   
=====



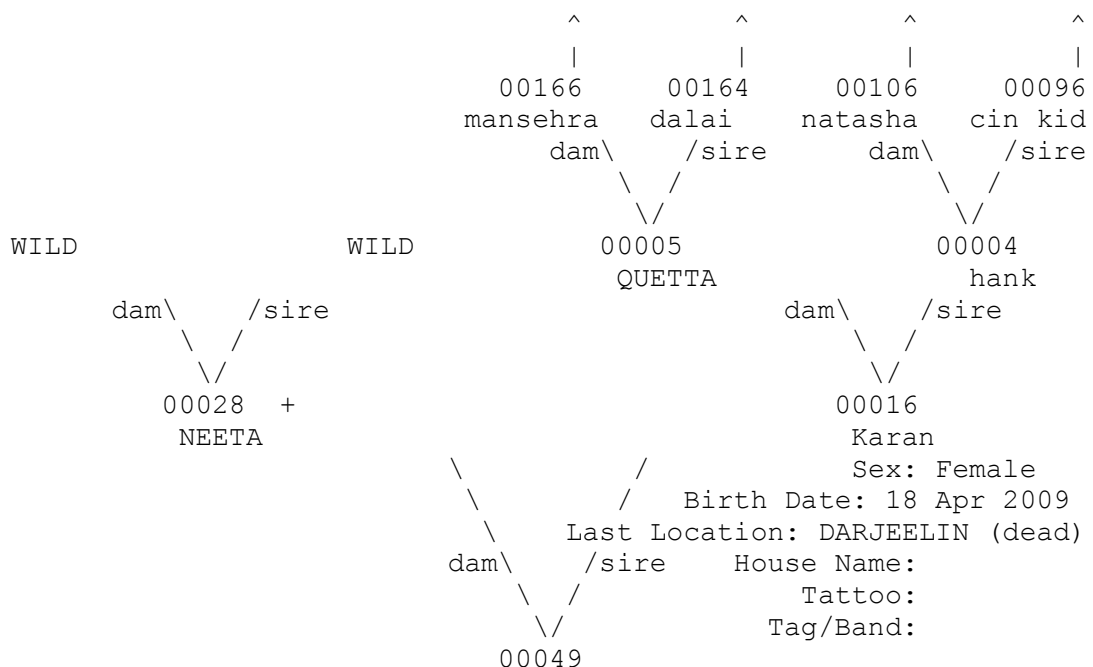
+ Wild-caught... \* Appear more than once...  
 ^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00048
   
=====



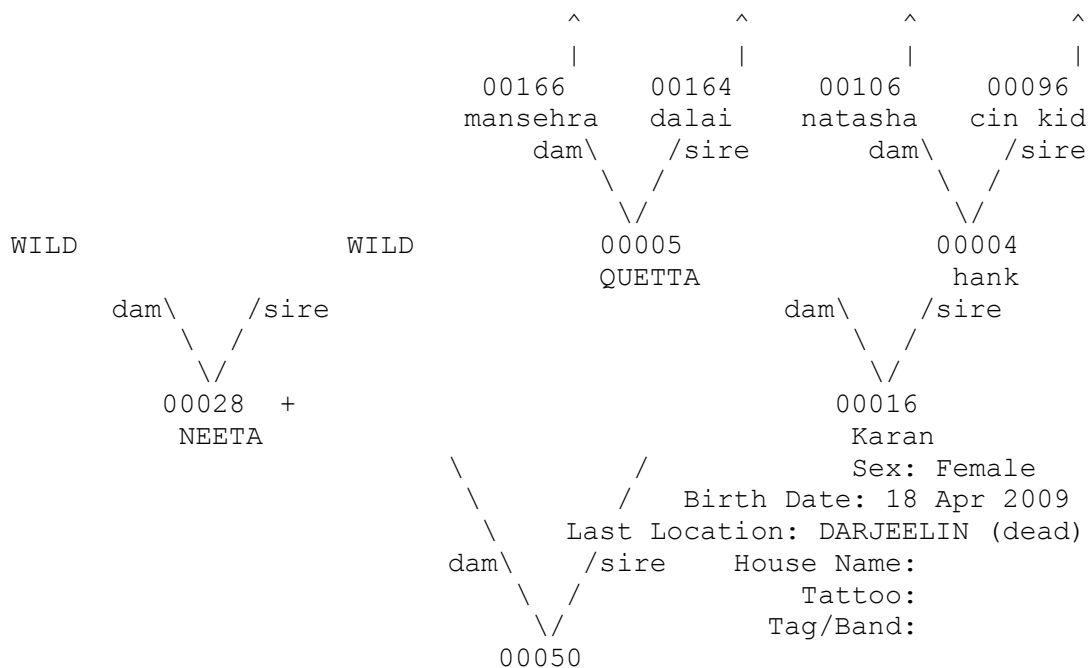
+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00049
   
=====



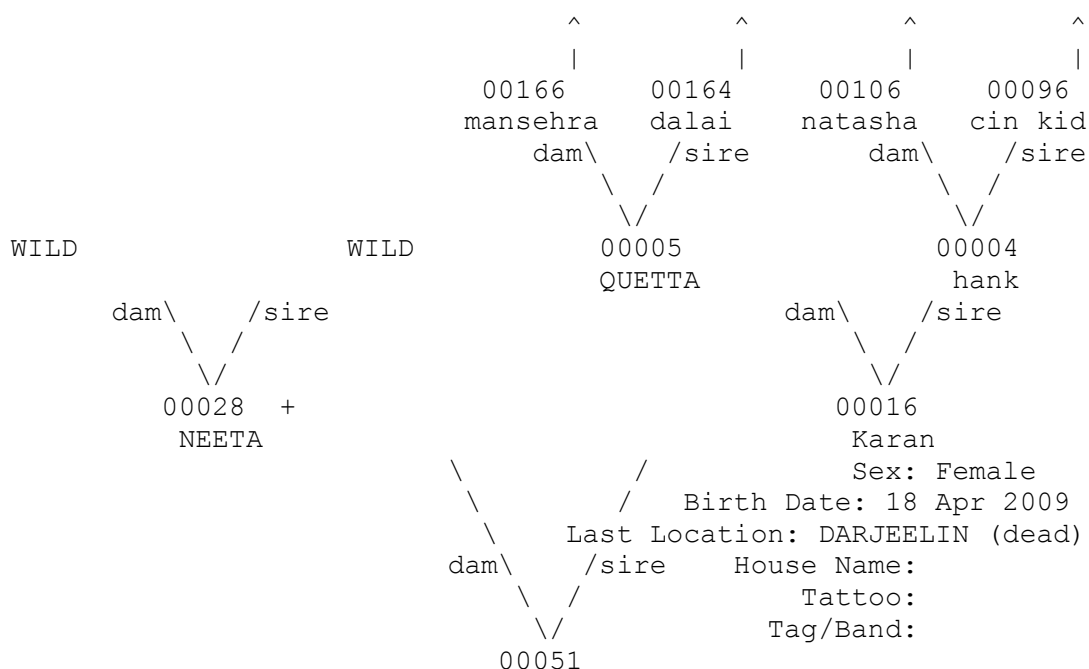
+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00050
   
=====



+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00051
   
=====

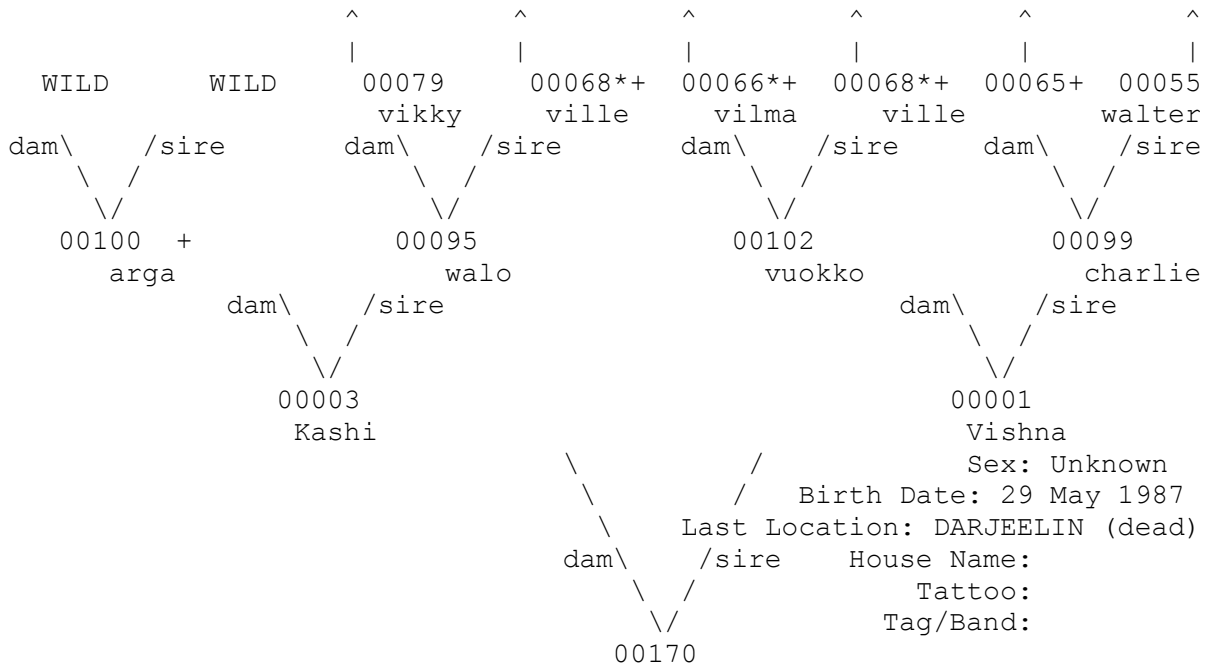


+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

=====

Taxon Name: UNCIA UNCIA Studbook Number: 00170

=====

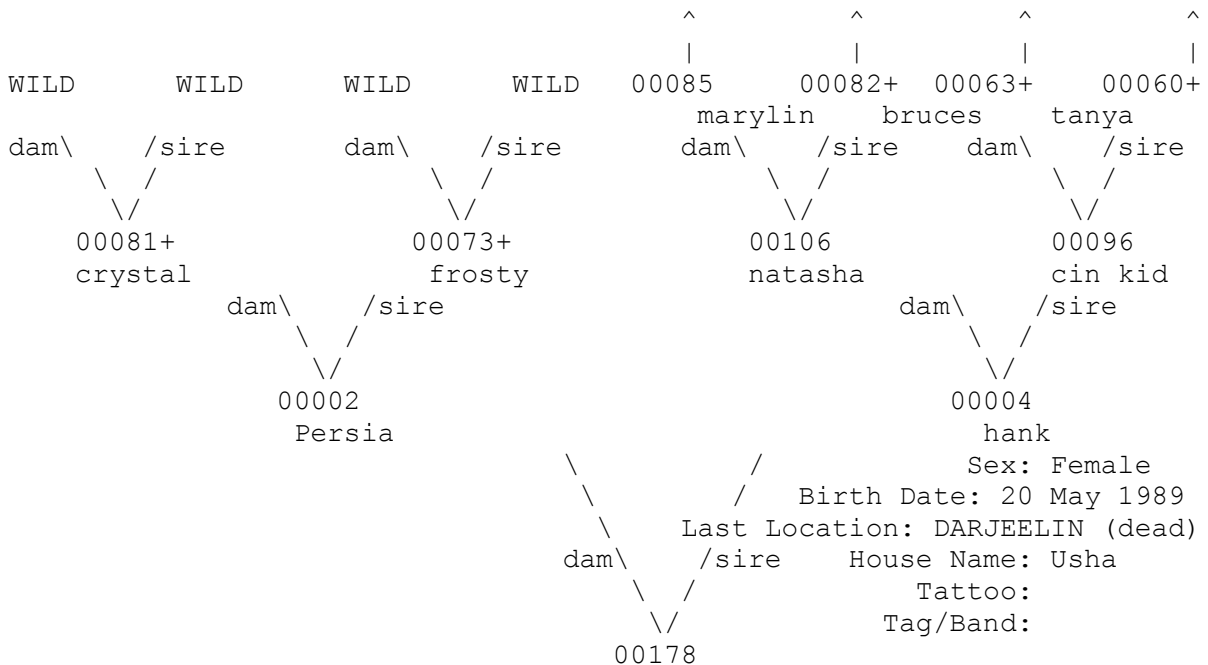


+ Wild-caught... \* Appear more than once...  
 ^ Pedigree continues beyond top of page...

=====

Taxon Name: UNCIA UNCIA Studbook Number: 00178

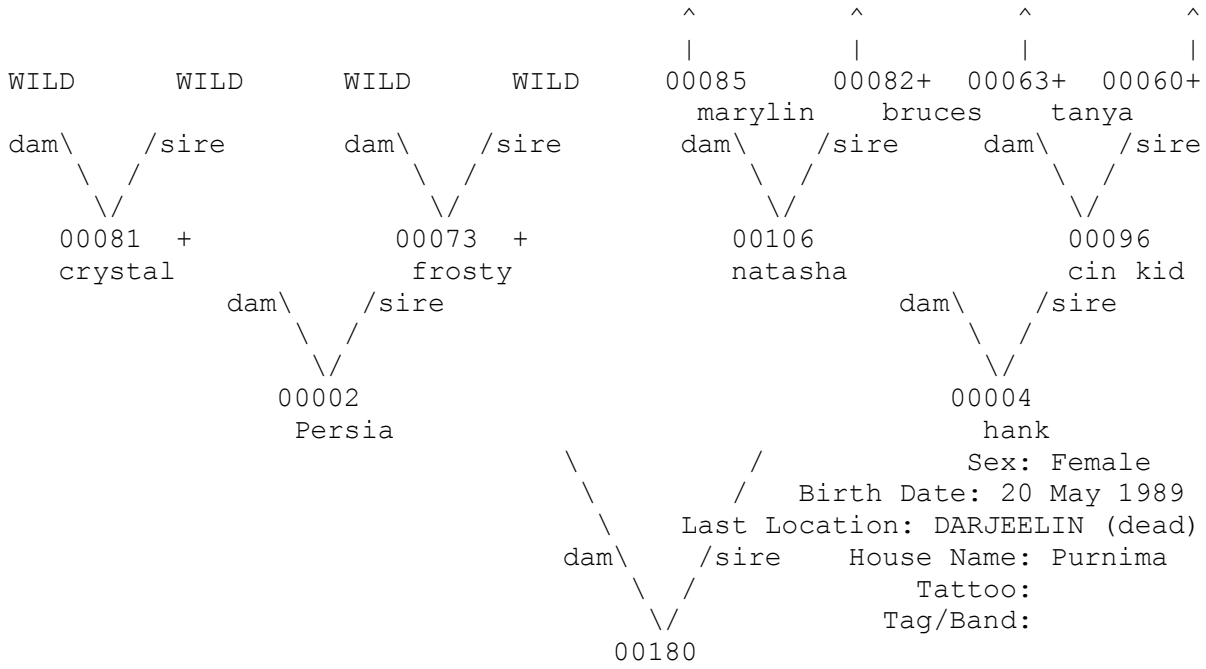
=====



+ Wild-caught...  
 ^ Pedigree continues beyond top of page...

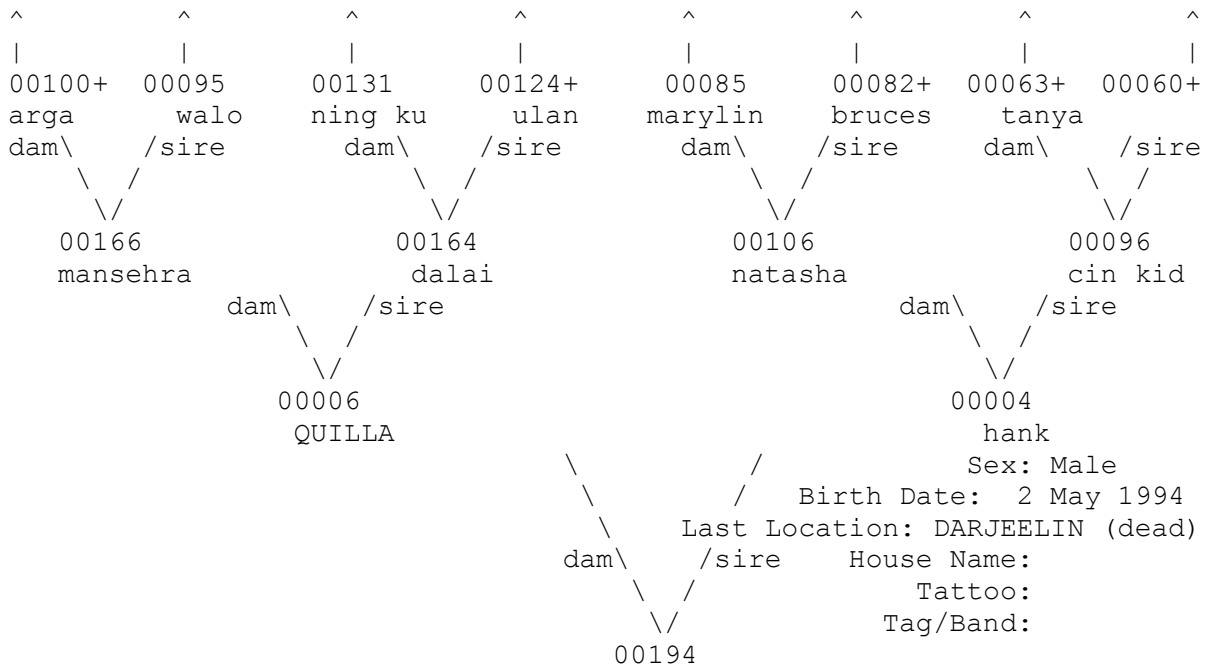


=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00180
   
=====



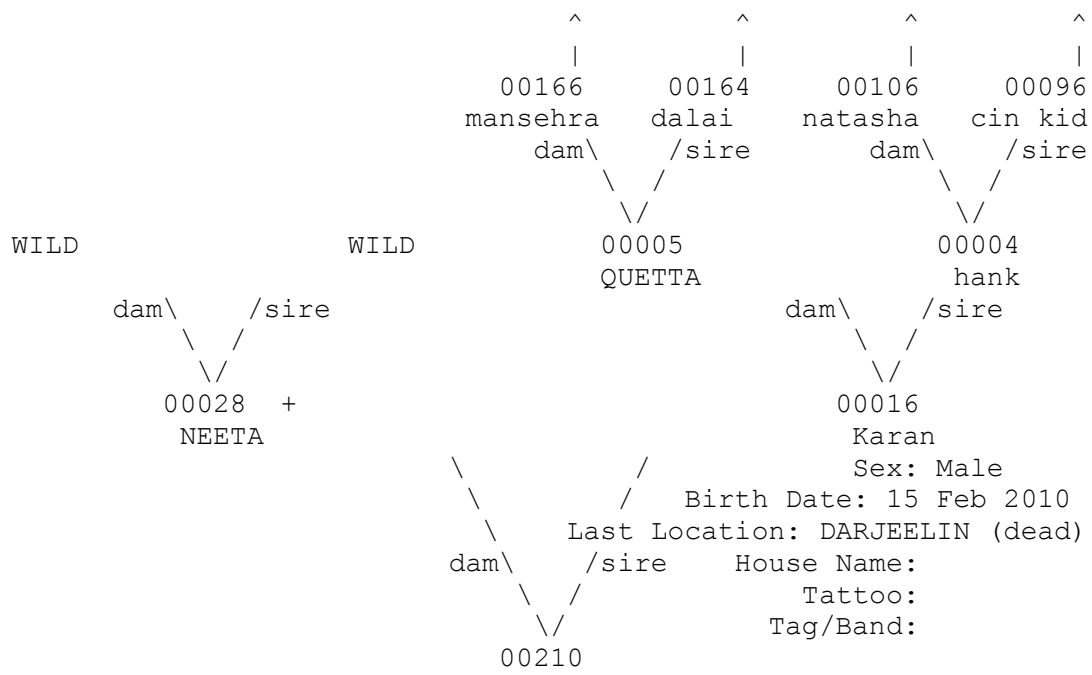
+ Wild-caught...
   
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00194
   
=====



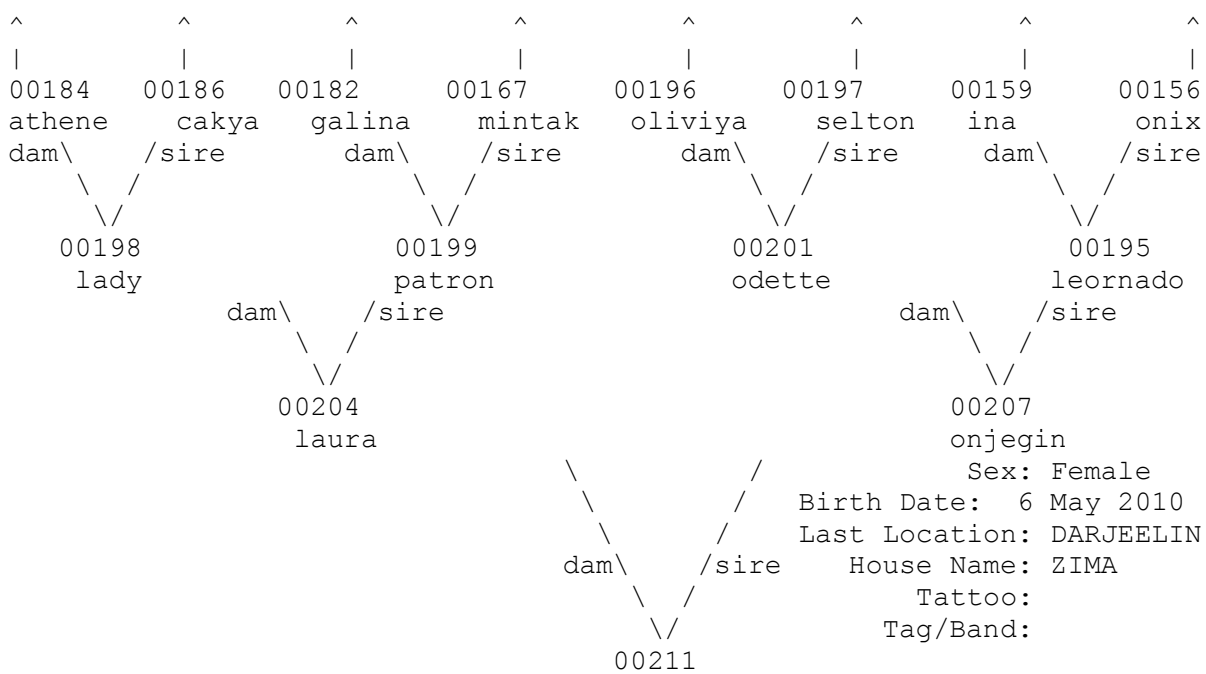
+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00210
   
=====

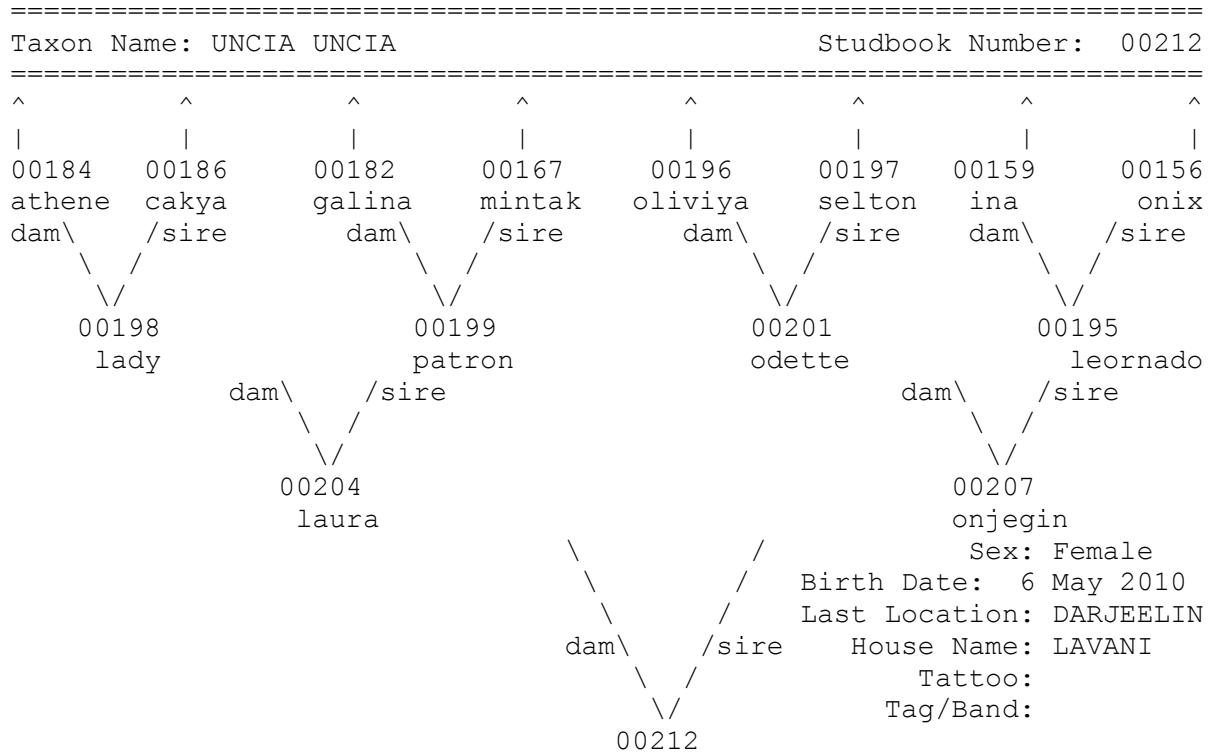


+ Wild-caught... \* Appear more than once...
   
^ Pedigree continues beyond top of page...

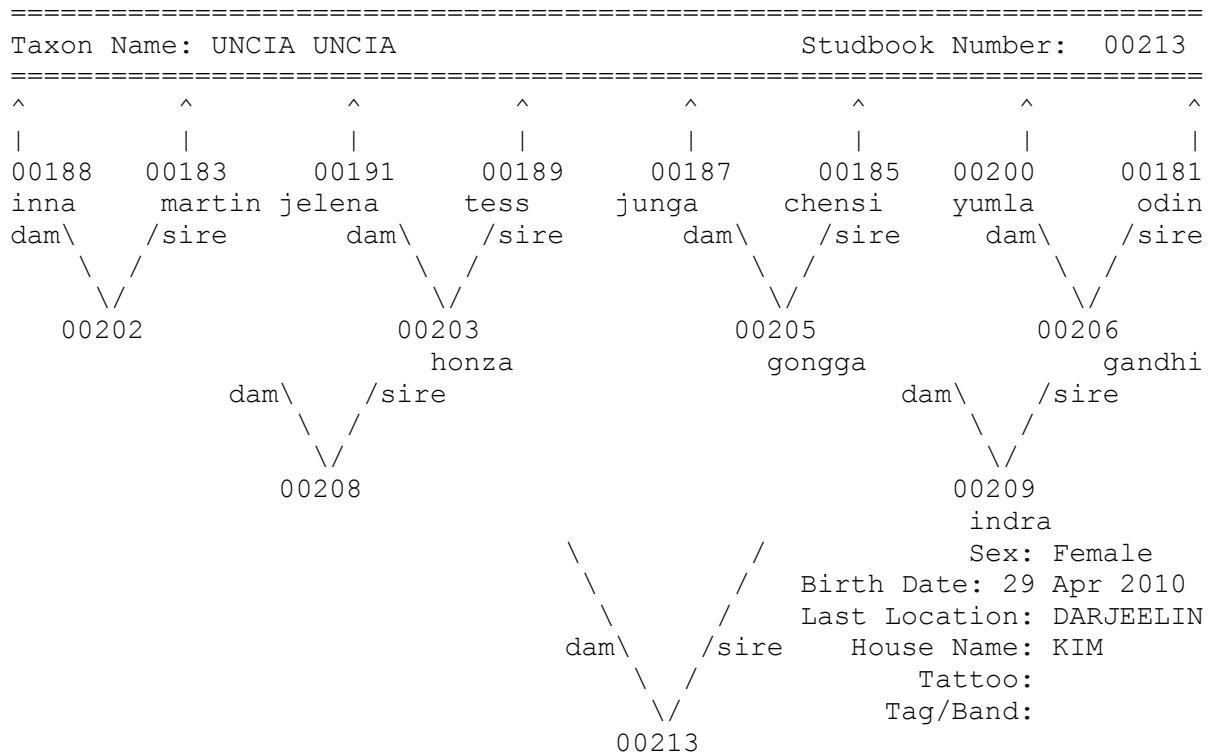
=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00211
   
=====



\* Appear more than once...
   
^ Pedigree continues beyond top of page...

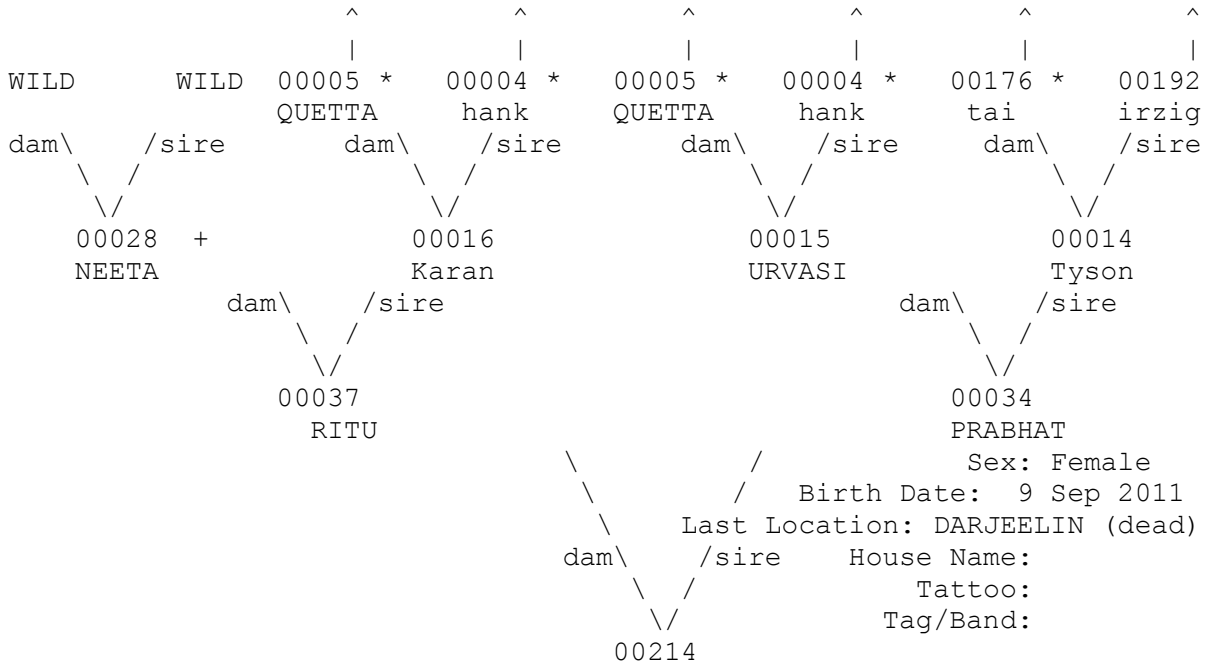


\* Appear more than once...  
^ Pedigree continues beyond top of page...



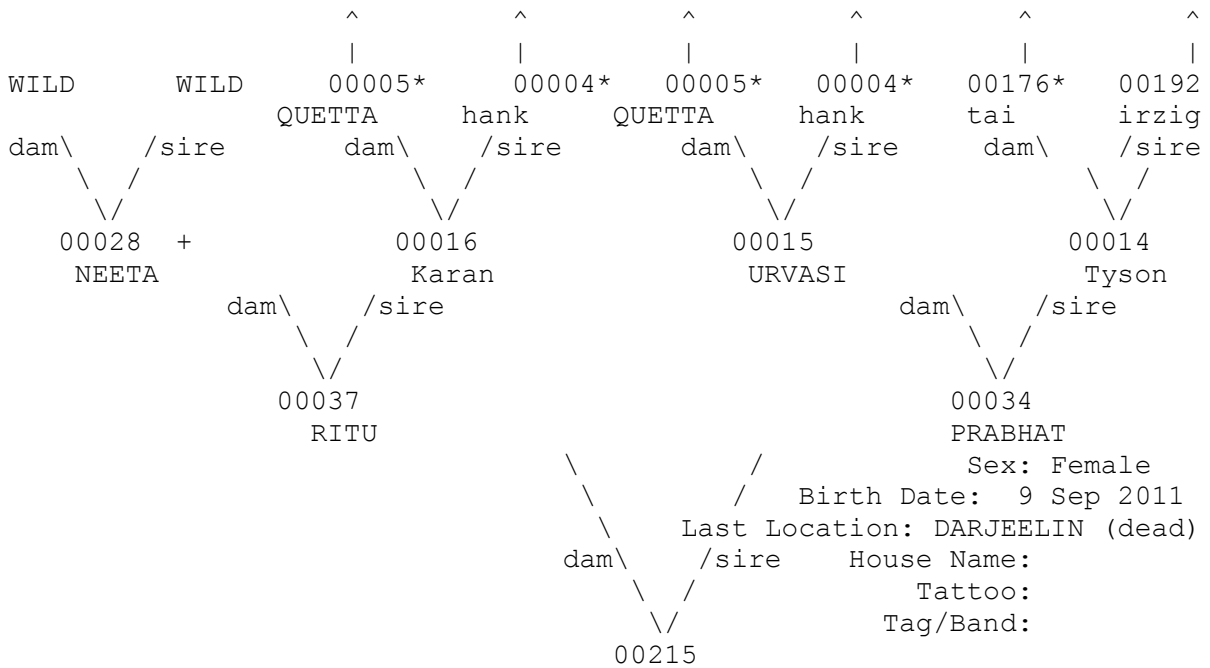
\* Appear more than once...  
^ Pedigree continues beyond top of page...

=====
Taxon Name: UNCIA UNCIA Studbook Number: 00214
=====



+ Wild-caught... \* Appear more than once...
^ Pedigree continues beyond top of page...

=====
Taxon Name: UNCIA UNCIA Studbook Number: 00215
=====



+ Wild-caught... \* Appear more than once...
^ Pedigree continues beyond top of page...



```

=====
Taxon Name: UNCIA UNCIA                          Studbook Number: 00218
=====
^         ^         ^         ^         ^         ^         ^         ^
|         |         |         |         |         |         |         |
00166*   00164*   00106   00096   00100*+  00095*   00131*   00124**
mansehra dalai   natasha  cin kid  arga      walo ning ku  ulan
dam\     /sire  dam\     /sire  dam\     /sire  dam\     /sire
  \     /      \     /      \     /      \     /
   \   /        \   /        \   /        \   /
00005         00004        00166*        00164*
QUETTA             hank    mansehra             dalai
                   dam\     /sire                dam\     /sire
                   \     /                        \     /
                   00015                       00007
                   URVASI                      QUIZIL
                                           Sex: Unknown
                                           Birth Date: 31 Mar 1999
                                           Last Location: DARJEELIN (dead)
                                           House Name:
                                           Tattoo:
                                           Tag/Band:

                                           dam\     /sire
                                           \     /
                                           00218

+ Wild-caught... * Appear more than once...
^ Pedigree continues beyond top of page...

```

```

=====
Taxon Name: UNCIA UNCIA                          Studbook Number: 00219
=====
^         ^         ^         ^
|         |         |         |
00166   00164   00106   00096
mansehra dalai   natasha  cin kid
dam\     /sire  dam\     /sire
  \     /      \     /
   \   /        \   /
00005         00004
QUETTA             hank
                   dam\     /sire
                   \     /
                   00015
                   URVASI

                                           UNK
                                           Sex: Unknown
                                           Birth Date: 19 Oct 1999
                                           Last Location: DARJEELIN (dead)
                                           House Name:
                                           Tattoo:
                                           Tag/Band:

                                           dam\     /sire
                                           \     /
                                           00219

* Appear more than once...
^ Pedigree continues beyond top of page...

```

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00220
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00166      00164      00106      00096      00149 *    00139 *    00176 *    00175
mansehra   dalai     natasha   cin kid   sita        orion     tai        olf
dam\      /sire     dam\      /sire     dam\      /sire     dam\      /sire
  \      /         \      /         \      /         \      /
   \    /           \    /           \    /           \    /
    00005          00004          00176 *          00192
  QUETTA         hank          tai          irzig
                dam\      /sire                dam\      /sire
                \    /                \    /
                00009          00014
                Ramba          Tyson
                                Sex: Unknown
                                Birth Date: 19 Jun 2002
                                Last Location: DARJEELIN (dead)
                                House Name:
                                Tattoo:
                                Tag/Band:
                                ^
                                |
                                00220
=====

```

\* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00221
=====
^           ^           ^           ^           ^           ^           ^           ^
|           |           |           |           |           |           |           |
00100+    00095     00131     00124+    00149*    00139*    00176*    00175
arga      walo     ning ku   ulan     sita      orion     tai        olf
dam\     /sire     dam\     /sire     dam\     /sire     dam\     /sire
  \     /         \     /         \     /         \     /
   \   /           \   /           \   /         \   /
    00166          00164          00176 *          00192
  mansehra       dalai          tai          irzig
                dam\     /sire                dam\     /sire
                \   /                \   /
                00006          00014
                QUILLA          Tyson
                                Sex: Unknown
                                Birth Date: 26 May 2003
                                Last Location: DARJEELIN (dead)
                                House Name:
                                Tattoo:
                                Tag/Band:
                                ^
                                |
                                00221
=====

```

+ Wild-caught... \* Appear more than once...  
^ Pedigree continues beyond top of page...

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00222
=====
^         ^         ^         ^         ^         ^         ^         ^
|         |         |         |         |         |         |         |
00100+   00095     00131     00124+   00149*   00139*   00176*   00175
arga     walo      ning ku    ulan     sita     orion    tai      olf
dam\    /sire    dam\    /sire    dam\    /sire    dam\    /sire
 \      /      \      /      \      /      \      /
  00166      00164      00176 *      00192
mansehra    dalai    tai      irzig
 dam\      /sire    dam\      /sire
  \      /      \      /
   00006      00014
  QUILLA      Tyson
                Sex: Unknown
                Birth Date: 26 May 2003
                Last Location: DARJEELIN (dead)
                House Name:
                Tattoo:
                Tag/Band:
                \      /
                 dam\ /sire
                  \      /
                   00222

+ Wild-caught... * Appear more than once...
^ Pedigree continues beyond top of page...

```

```

=====
Taxon Name: UNCIA UNCIA                               Studbook Number: 00223
=====
^         ^         ^         ^
|         |         |         |
00166     00164     00106     00096
mansehra  dalai    natasha  cin kid
 dam\    /sire    dam\    /sire
  \      /      \      /
   00005      00004
  QUETTA      hank
   dam\      /sire
    \      /
     00015
    URVASI

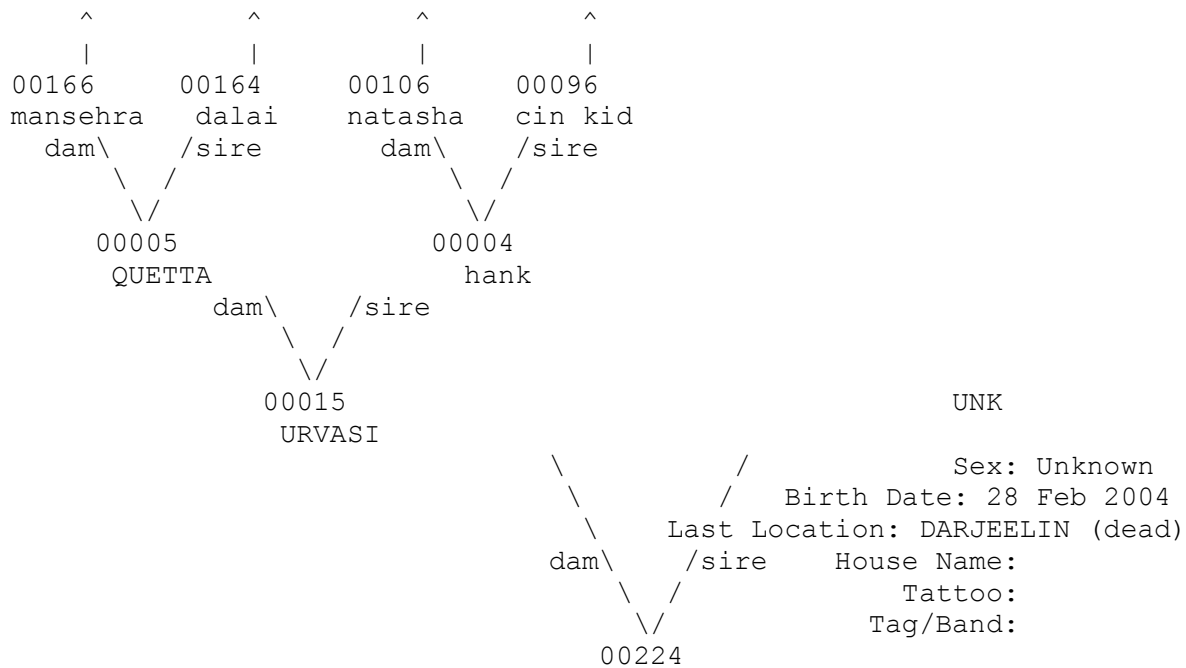
                Sex: Unknown
                Birth Date: 28 Feb 2004
                Last Location: DARJEELIN (dead)
                House Name:
                Tattoo:
                Tag/Band:
                \      /
                 dam\ /sire
                  \      /
                   00223

* Appear more than once...
^ Pedigree continues beyond top of page...

```

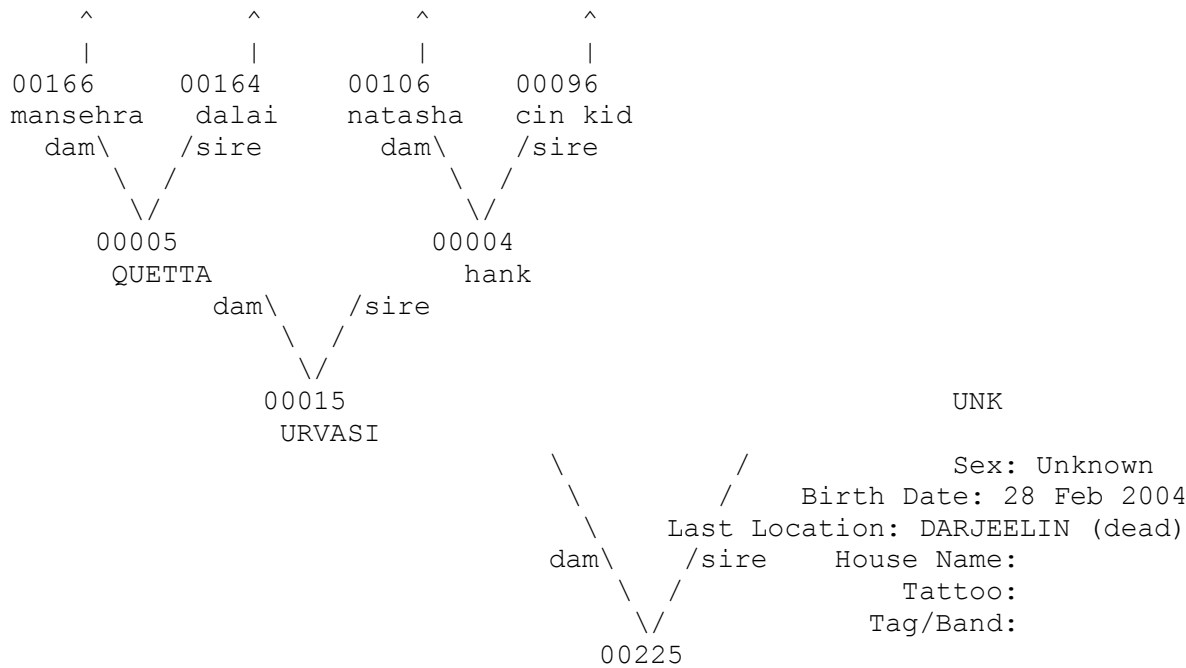


=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00224
   
=====



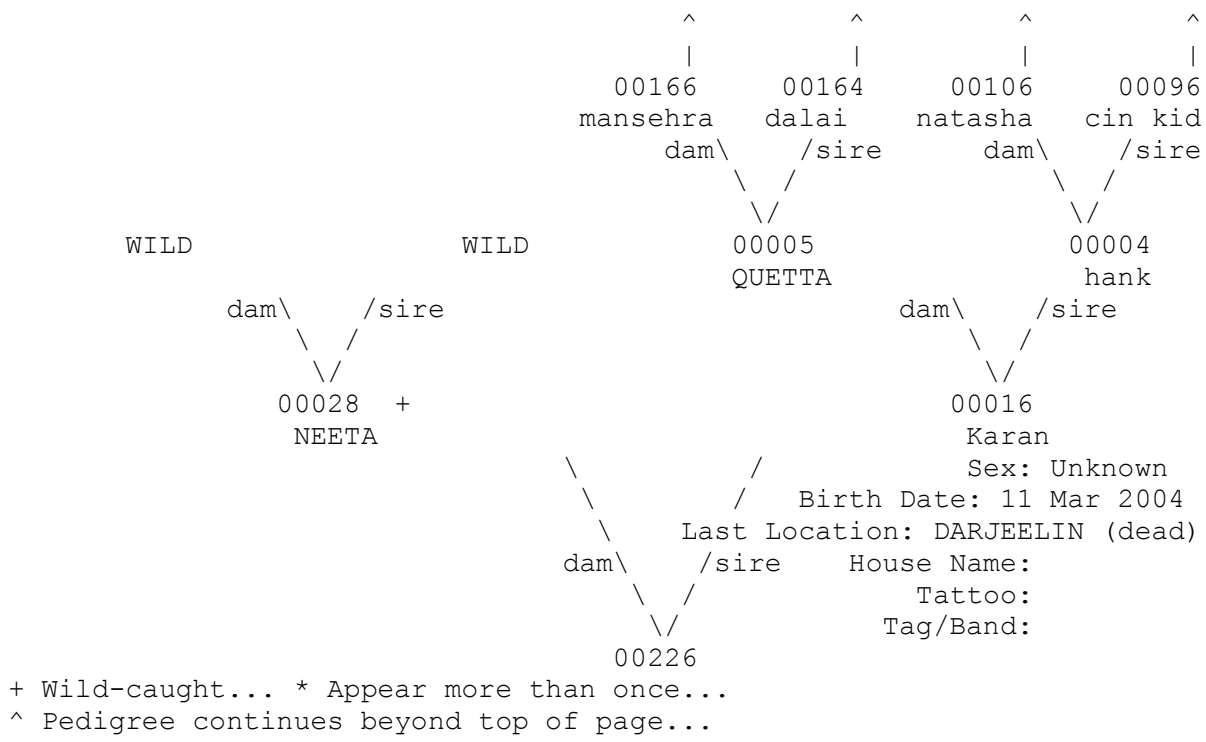
\* Appear more than once...  
 ^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00225
   
=====

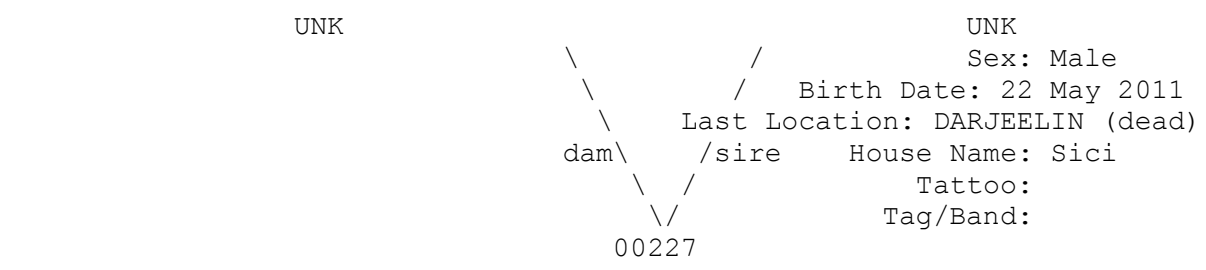


\* Appear more than once...  
 ^ Pedigree continues beyond top of page...

=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00226
   
=====



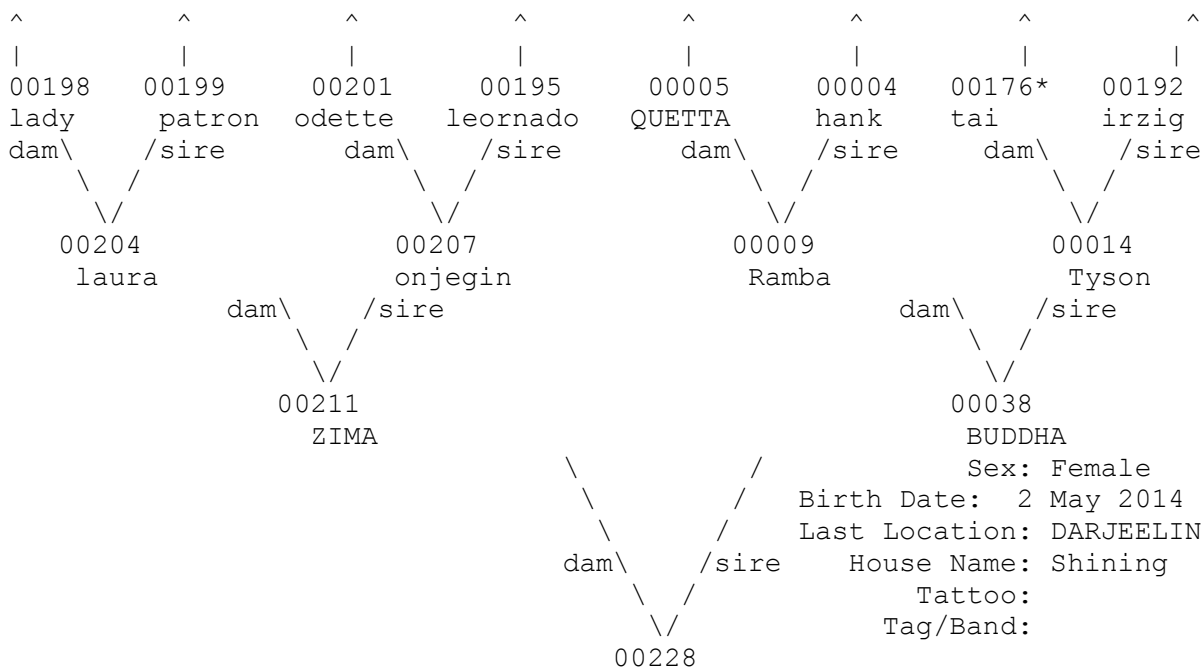
=====
   
Taxon Name: UNCIA UNCIA Studbook Number: 00227
   
=====



=====

Taxon Name: UNCIA UNCIA Studbook Number: 00228

=====

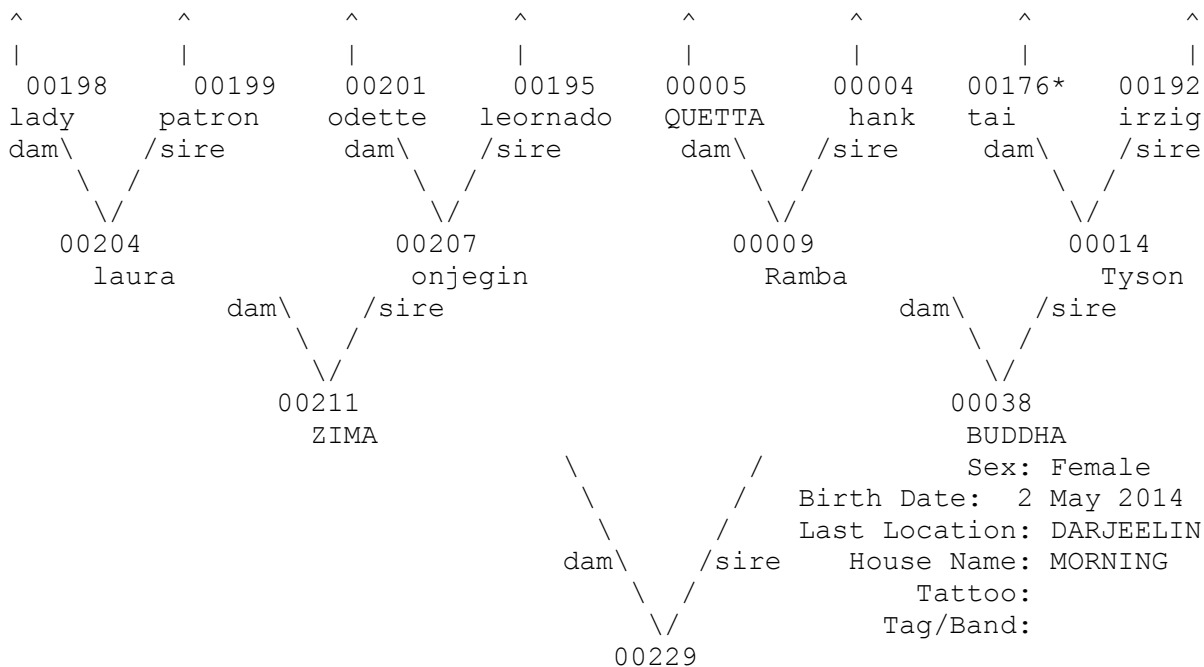


\* Appear more than once...  
^ Pedigree continues beyond top of page...

=====

Taxon Name: UNCIA UNCIA Studbook Number: 00229

=====



\* Appear more than once...  
^ Pedigree continues beyond top of page...