

# NATIONAL STUDBOOK

## Himalayan Monal (*Lophophorus impejanus*)

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

Data Till: March 2016

Published: June 2016



भारतीय वन्यजीव संस्थान  
Wildlife Institute of India



केन्द्रीय चिड़ियाघर प्राधिकरण  
Central Zoo Authority

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Wildlife Institute of India (2016). National Studbook of Himalayan Monal (*Lophophorus impejanus*),  
Wildlife Institute of India, Dehradun and Central Zoo Authority, New Delhi. TR. No.2016/007

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## Foreword

Habitat loss, fragmentation and degradation coupled with poaching are limiting the growth of wild populations of several species; increasingly rendering them vulnerable to extinction. For species threatened with extinction in their natural habitats *ex-situ* conservation offers an opportunity for ensuring their long-term survival. This can be ensured by scientific management to ensure their long term genetic viability and demographic stability. Pedigree information contained in studbooks forms the basis for this management.

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

As part of the project outcomes the WII has compiled the II edition of the National Studbook of Himalayan Monal (*Lophophorus impejanus*) in Indian zoos. The recommendations contained in the studbook will form the basis for the long term management of the species in captivity. It is hoped that the holding institutions 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.

**(Dr. D.N. Singh, I.F.S.)**  
**Member Secretary**  
**Central Zoo Authority**

## Acknowledgement

The National Studbook of Himalayan Monal (*Lophophorus impejanus*) 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 Project team is thankful to the Central Zoo Authority for the financial support in carrying out the assignment. The guidance and support extended by Dr. D. N. Singh, IFS, Member Secretary, CZA is gratefully acknowledged. The authors also thank Dr. Brij Kishore Gupta, Evaluation and Monitoring Officer, Dr. Devender Singh, Scientific Officer, Shri. Vivek Goel 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. G.S. Rawat, Dean Faculty of Wildlife Sciences, is also acknowledged.

The team sincerely acknowledges the support and help extended by holding zoos listed below towards facilitating the successful development of the studbook.

1. Himalayan Nature Park, Kufri
2. Himalayan Zoological Park, Bulbuley, Gangtok
3. Padmaja Naidu Himalayan Zoological Park, Darjeeling
4. Pandit Govind Ballabh Pant High Altitude Zoo, Nainital
5. Sarahan Phsantry, Sarahan
6. Sri Chamarajendra Zoological Garden, Mysore

We also thank Mr. Mukesh Arora for layout and design of this document.

**Project team**

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## Species Biology

Monal pheasants, are amongst the most iridescent birds in the world (Beebe, 1918-22) with the Himalayan Monal being considered one of the most beautiful and magnificent pheasants of the western Himalayas because of the male's metallic, rainbow-coloured plumage and iridescent blue head crest. It has been included into the traditional folklore of many Himalayan cultures (Delacour, 1977) and is the National Bird of Nepal and the State Bird of Uttarakhand, India.

### Taxonomy

Phylum: Chordata

Subphylum: Vertebrata

Class: Aves

Order: Galliformes

Family: Phasianidae

Subfamily: Phasianinae

Genus: *Lophophorus* (Temminck, 1813)

Species: *Lophophorus impejanus* (Latham, 1790)

Himalayan monal (*Lophophorus impejanus* Latham, 1790) is one of the three species included in the genus *Lophophorus*, the other two being Sclater's monal (*Lophophorus sclateri* Jerdon, 1870) and Chinese monal (*Lophophorus ihuysii* Hilaire, 1866). These are distributed in north-east Himalayas in India, Burma and China and south-east China respectively. Their close similarity indicates a common ancestry; with a single population that was fragmented during the Pleistocene glaciations into several groups and evolved to species level (Davison, 1974). A *Lophophorus* type, discovered in western Arunachal Pradesh (Kumar and Singh, 1999) differs from both Himalayan Monal and Sclater's Monal in its pure white central tail feathers and appears to be a western form of Sclater's Monal but the exact taxonomic relationship between the two forms requires further investigation (Kumar and Singh, 2000).

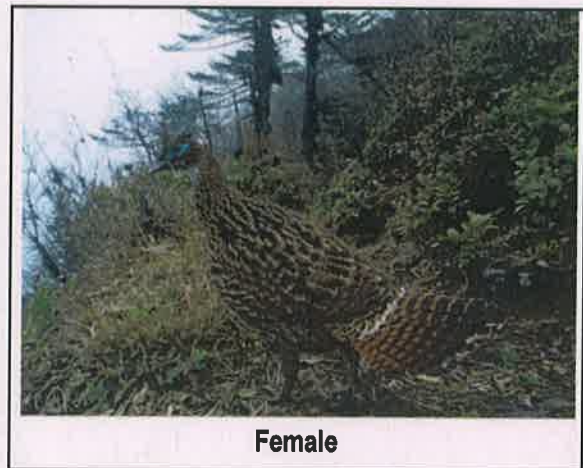
Based on individual variation in extent and colour of iridescence and the extent of white on the back, several geographical races have been described for Himalayan Monal. These include: *chambanus* (from Himachal Pradesh, in north-west India) with males without any white on back and an extensively green breast; *mantoui* (males with green replaced by purple) and *obscura* (males with body feathers mostly black, and gloss confined to wings). Females towards the eastern part of the range are more ornate with shades of red-brown. Individual variations in this species are; however, so immense that naming of races has not been suggested (Madge and McGowan, 2002).

Based on assessment of phylogenetic relationships, biogeography, classification, and morpho-behavioral evolution in, gallinaceous birds monal pheasants were proposed to be included in the family Phasianidae and subfamily Phasianinae. The subfamily includes monals (*Lophophorus*), tragopans (*Tragopan*), pheasants (*Phasianus*, *Chrysolophus*, *Lophura*, *Catreus*, *Crossoptilon*) (Crowe, et al. 2006). Based on Mitochondrial DNA analyses Tragopan, Lophophorus, and Tetraophasis were grouped together (Huang, et al. 2009); while Shen and co-workers (2010 and 2014) suggested that the family

Phasianidae included seven lineages one of which included the tragopans (*Tragopan*), Monals (*Lophophorus*) and turkeys and partridges (*Tetraophasis*). The taxonomic affinities of the genus *Lophophorus* need further phylogenetic studies for resolution of its taxonomic position.

### Morphology

Monals are large, stocky montane pheasants exhibiting high sexual dimorphism with extremely bright colouration in males. Adult males possess metallic green head and spatulate-tipped wire-like crest, brilliant metallic green and bronze on hind neck and mantle, iridescent blue and purple and green on wings and upper tail-coverts, cinnamon-brown tail, and velvety-black under-parts (Sathyakumar and Kaul, 2007). Tail feathers of the male are uniformly rufous, darker towards the tips. The peacock-like crest, all rufous tail and a prominent white back while in flight are distinctive features of the male monal. The females are smaller with dark brown upperparts which are boldly streaked, and vermiculated pale buff on dark brown underparts, a short crest, a prominent white throat and bare bluish orbit skin. The tail is dark and narrowly barred buff, while the upper tail-coverts and tail are white, forming a horseshoe during flight (Madge and McGowan, 2002). The short crest (of about 2.5 cm) and almost absence of a white band in females, distinguish the species from the similar Sclater's monal, while the smaller overall size and absence of white on the lower back differentiates it from the Chinese monal (Johnsgard, 1986).



The weight of males ranges from 1.98 to 2.38 kg and that of females from 1.80 to 2.15 kg (Johnsgard, 1986) (Table 1). First year males resemble adult females, their adult plumage being attained in the second year; the juveniles are similar to females but with less distinct markings (Delacour, 1977). Monals possess well-built legs and strong and markedly curved bills with the upper mandibles conspicuously overlapping the lower; these together allow them to dig into the hard soil of the mountains to uncover food.

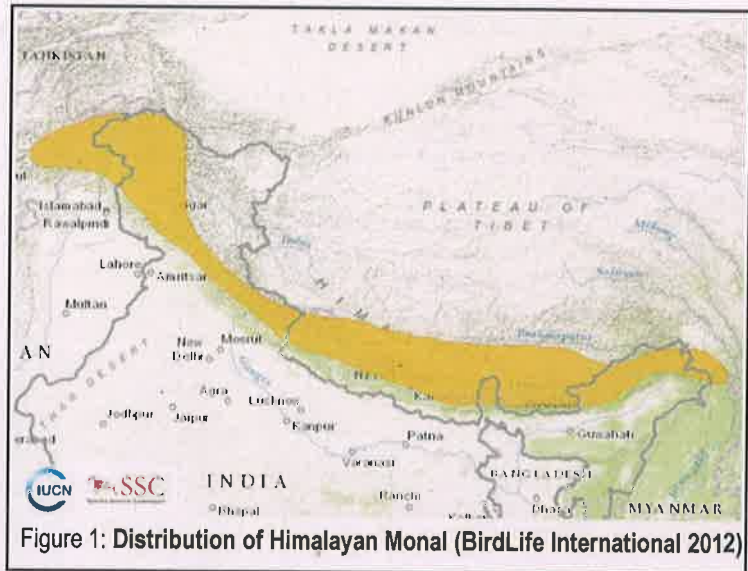
**Table 1:** Morphometrics of Himalayan Monal

Length	Male- 70-72 cm Female- 64 cm (Madge and McGowan, 2002)
Wings	Male-28.9-32.0 cm Female- 25.9-28.7 cm (Ali and Ripley, 1978)
Tarsus	Male-70-80 cm
Tail	Male- 21.5-23.5 cm Female- 18.2-20.0 cm (Madge and McGowan, 2002)
Weight	Male- 1.980-2.380 kg Female- 1.800-2.150 kg (Johnsgard, 1986)



## Distribution

The Himalayan Monal is widely distributed from eastern Afghanistan through the Himalayas, including Pakistan, India (Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh), China (Tibet region), Nepal and Bhutan. The bird has also been reported from Myanmar, based on a specimen taken in 1969 from the Hpungan pass (27°30'N, 96°48'E) along the Indo-Myanmar border (Yin, 1970).



## Habitat

The Himalayan Monal is a high altitude species inhabiting steep slopes and cliffs with a rocky terrain interspersed with grass and wood patches. The altitudinal range utilized varies between 2400 and 4500 m, with highest occupancy occurring at a narrow stretch of 2700 and 3700 m (Grimmett, *et al.* 1998). They exhibit considerable seasonal altitudinal migrations (Gaston, *et al.* 1981), mostly distributed at altitudes between 2620 m and 3350 m in summer and between 2000 m and 2800 m in winter (Ramesh, 2003); with relative preference to sub alpine oak forest in spring and conifer dominated forests during winter (Ramesh, 2003). Cliffs are mainly used as an escape terrain and sites for basking; and in combination with dense forest cover provide foraging grounds during the snowbound period. The plain areas on top of cliffs in higher areas are associated with intense courtship activities during the breeding season at the onset of summer (Kumar, *et al.* 2006).

The species is distributed through various forest types, including the upper temperate oak-conifer forests; subalpine oak forests; deodar, coniferous and rhododendron forests with patches of montane bamboo and grass; and alpine scrub and meadows (Gaston, *et al.* 1981). In the Tibet region of China, the birds mainly occur in rocky forests dominated by *Quercus semecarpifolia*, *Picea spinulosa* and *Abies spectabilis* tree species (Xiaochun, *et al.* 2011).

## Behaviour and Social Organization

*Lophophorus impejanus* is considered the easiest of the Himalayan pheasants to observe; although cautious, it is slightly less wary than the other species and can often be seen in summer foraging in pastures and flushing out even when disturbed at greater distances (Madge and McGowan, 2002).

The birds are reported to be gregarious, but ties between flock members are loosely defined, with real flocks being formed only during winter, when the birds are forced into restricted habitats (Beebe, 1918-



22). The group size varies seasonally; being small during summer (the breeding season) and reaching a congregation of up to 11 individuals during winter months. Sightings of solitary individuals (both male and female), male - female pairs and mixed or unisex groups have been reported (Kumar, *et al.* 2006, Miller 2010). Mixed groups are usually predominated by females (Ramesh 2003, Kumar, *et al.* 2006), while all female flocks also comprise of immature birds, in their first year plumage (Kumar *et al.* 2006). Males are reported to be territorial, remaining solitary close to the treeline to establish dominance for occupying the best display sites in the area; while females mostly occur in large flocks at lower altitudes, due to the need for woodland cover to avoid predation (Kumar, *et al.* 2006). Studies from GHNP (Great Himalayan National Park), Himachal Pradesh, reported their group size to range between 1 to 11 individuals with a mean group size of  $1.61 \pm 1.21$  individuals (Ramesh, 2003).

They are highly vocal birds using a wide range of calls to differentiate between contentment, aggression, alarm and advertisement for a mate. When alarmed they exhibit a two-note whistle, which is rendered as *kleeh-wick kleeh-wick*, interspersed with several shorter *kwick kwick* calls. Breeding calls (mostly by males) are emitted from dawn to mid-morning and at dusk from the roost site. These are a series of distinctive upwardly inflected whistles sounding like *kur-lieu* or *kleeh-wick*, each whistle separated by a single high-pitched note (Madge and McGowan, 2002). They roost on large oak trees, mostly close to cliffs at altitudes between 2,800-3,100 m (Kumar, *et al.* 2006).

### **Food and Feeding Ecology**

The diet of the species primarily consists of tender leaves, seeds, shoots, berries, tubers, nuts and insects and their larvae (Ramesh, 2003). They mainly feed by digging with the beak, searching for underground tubers, bulbs or fleshy root. Pits dugout are unique and considered as indicators of their presence in an area. They forage alone as well as in small to large flocks, in wooded areas and in the open forest patches or on cliffs. The foraging sites are repeatedly visited, with several birds congregating there (Kumar *et al.* 2006). Remains of tubers of the herbs *Dactylorhiza hatagirea*, *Taraxacum officinale*, *Satyrum Nepalese*, *Roscoea alpine* and roots of *Gualtheria nummelleroides* have been reported from monal dug out pits in the Kedarnath Wildlife Sanctuary, Uttarakhand (Kumar, *et al.* 2006). While in Pakistan, monal are reported to feed on the bulbs of *Gagea*, rhizomes of *Iris hookeriana* and *Eremurus* tubers during winter and early spring (Roberts, 1991; Hussain, 2013). Reports from Nepal, indicate a dietary preference of tubers of herbaceous plants *Meconopsis paniculata* and *Arundinaria* sp., grass roots and mosses have been reported (Yonzon and Lelliot, 1981). Invertebrates formed a minor and trace portion in the diet for all pheasant species. Studies on nutrition of captive birds suggest that a protein rich diet is essential for ensuring the high survival rates of Galliform chicks, (Hill, 1985) being obtained from obtained from insects during the first few weeks of life.

### **Reproduction**

Himalayan Monal are seen in pairs during the breeding season (April to August) (Ramesh, 2003) with the breeding season extending from mid-April to mid-July, (mid-April to end of June) in India (Johnsgard, 1986). The mating pattern is uncertain (Madge and McGowan, 2002); however, the high degree of sexual dimorphism and the tendency of females to be gregarious are conditions indicative of

a polygynous mating system in the species (Baker 1935, Ridley, 1982). The altitudinal range utilized during the breeding season, ranges from 2400 m to as much as 4200 – 4500 m.

Males' perform courtship displays on rock outcrops showing strong site fidelity that include both, lateral and frontal displays as well as display flights. These involve the male fanning its tail, drooping its wings and strutting around the female, flaunting its brightly coloured plumage and gliding on spread tail, with wings held above the body, while uttering a piping call (Madge and McGowan, 2002). These displays early during the season serve to establish their dominance over other males as well as to initiate bonding with the females (Kumar, *et al.* 2006).

The species is a ground nester with shallow unlined scrapes in grass patches often sheltered by rocks or trees serving as nests. The clutch size varies between 3 to 6 eggs, and eggs are pale-yellowish or reddish buff in colour with reddish brown markings. The incubation period, ranges between 26-29 days, usually 28 days (Howman, 1993). Information pertaining to the adult male's role in caring for the young is not clear, though most authorities contend that it has no function in raising the young. Sexual maturity is attained during the second year of life (Johnsgard, 1986).

**Table 2:** Reproductive attributes of Himalayan Monal

Call	kleeh-wick kleeh-wick
Age at sexual maturity	2 years (Johnsgard, 1986)
Mating System	Uncertain, polygamy suspected (Baker 1935, Ridley 1984)
Breeding Season	Mid-April-mid July (Madge and McGowan 2002)
Nest Site/ Type	Scrape among grasses, sheltered by rock/ fallen tree/ grasses on steep hillsides; usually unlined (Madge and McGowan, 2002)
Clutch Size	3-6 (Madge and McGowan, 2002)
Eggs	Pale yellowish or reddish-buff with reddish-brown markings (Madge and McGowan, 2002)
Incubation Period	28 days (Howman, 1993)
Attended by	Incubation is done entirely by the female (Johnsgard, 1986)

### Threats and Conservation Status

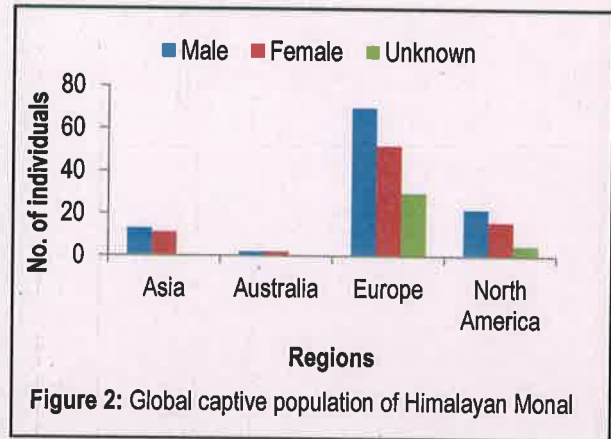
The species despite its extensive range is vulnerable to poaching, habitat loss and degradation (del Hoyo *et al.* 1994). In Himachal Pradesh, the birds were poached for their meat and crests, which were used for ornamentation. Legal restrictions on hunting and awareness campaigns since 1982 has reduced the hunting pressure to a great extent (Ramesh, 2003); however poaching for local consumption, especially during winter when the birds descend to lower altitudes, close to human habitations remains a serious threat (Ramesh, 2003; Poudyal, 2008).

The species has been declared as the state bird of Uttarakhand and is listed in Schedule I of the Wildlife (Protection) Act 1972 of India and listed in Appendix I of the CITES due to threats to its survival.

In Nepal the species is protected by National Parks and Wildlife (Protection) Act (1972). It is listed as a 'least concern' species by the IUCN red list due to the wide distribution range occupied and perceived large numbers.

### Status in Captivity

The global captive population of Himalayan Monal consists of 223 (107.81.35) individuals and are currently maintained in 88 institutions across 4 continents - Asia, Australia, Europe and North America (Figure 2) (ZIMS data current as on June 2016). This includes information from two Indian zoos, namely Darjeeling and Mysore, while other holding institutions need to update their records on the ZIMS platform. The current captive population in Indian institutions consists of 10 individuals that are housed across 4 facilities with two of them holding lone individuals (Table 3).

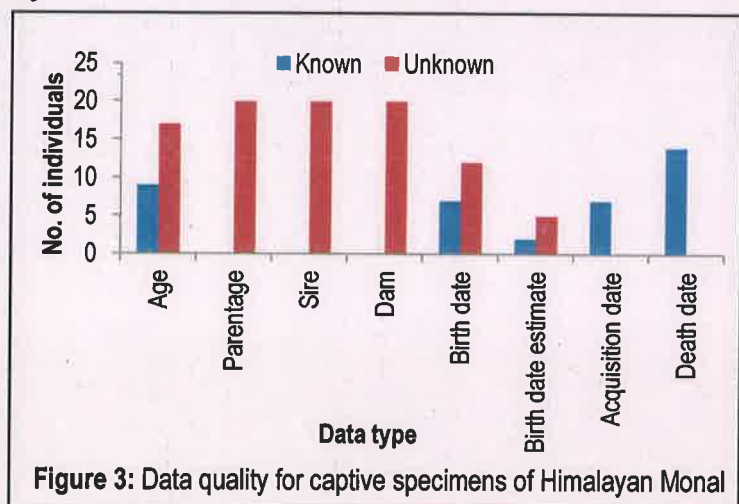


**Table 3: Status of Himalayan Monal in Indian zoos**

Location	Total no. of individuals (M.F.U)	Living Individuals (M.F.U)	Time span in captivity (years)	Hatches (M.F.U)	Deaths (M.F.U)
Darjeeling	5.4.4	2.2.0	1990-16 (27)	1.1.4	2.2.4
Gangtok	1.0.0	1.0.0	2012-16 (5)	0.0.0	0.0.0
Kufri	7.7.0	3.2.0	1988-16 (29)	4.4.0	0.2.0
Mysore	1.0.0	1.0.0	2006-16 (11)	0.0.0	0.0.0
Nainital	3.1.0	0.0.0	2003-05 (3)	0.0.0	3.1.0
Sarahan	2.3.0	0.0.0	1996-11 (16)	2.3.0	0.0.0

### Scope of the Studbook and Data Quality

The National Studbook of Himalayan Monal contains information on all captive specimens, held in Indian zoos. The studbook lists data that is current through March 2016 based on records made available by holding zoos. The availability and quality of data used for compilation of the studbook is summarized in Figure 3. A total of 26 birds are registered in the Studbook. The ages of 9





individuals were known, including that of 1 unknown-origin, 1 wild-born and 7 captive-born individual. Parentage records were unavailable for all specimens. Acquisition dates were available for the single unknown-origin bird and each of the 6 wild-born individuals; death dates were known for all the recorded mortalities.

## Methods

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

## ANALYSIS

### Historical Population

#### Census trends

A historical population of 26 specimens (13.09.04) is documented in the National Studbook. This includes 1 unknown-origin, 6 wild-born and 19 captive-born individuals. The origin and sex based census trend of the population since its first recorded entry in 1990 is represented in Figures 4 and 5 respectively. The figures indicate a small population size over the years with a median of 6 individuals ( $6.33 \text{ Mean} \pm 4.71 \text{ SD}$ ) per year. A peak of 11 individuals was reached in the years 2004 and 2010; however, the desired growth in population size did not occur. This could be attributed to the small number of surviving offspring ( $n=2$ ) and increased number of mortalities ( $n=7$ ) during the past 6 years. The population has a male bias throughout its history

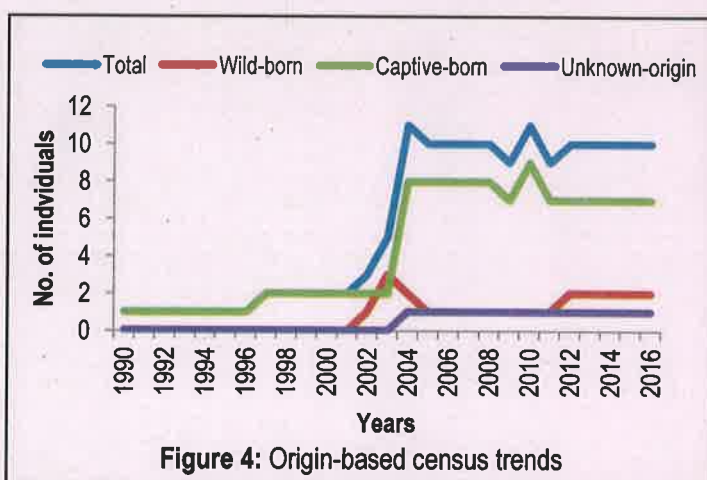


Figure 4: Origin-based census trends

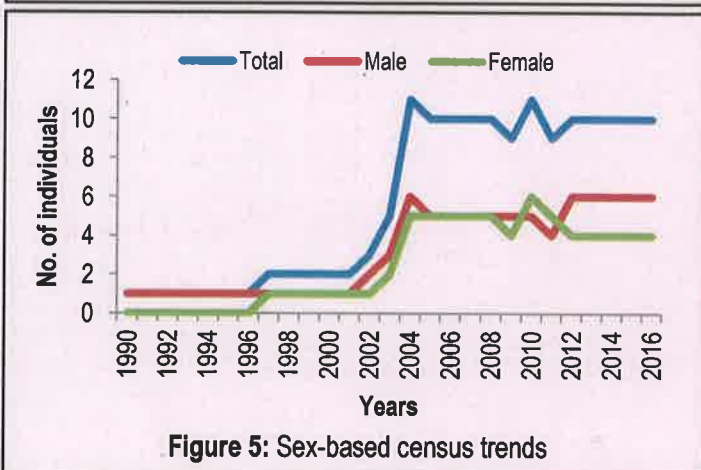


Figure 5: Sex-based census trends

due to the higher number of males acquired from wild (5.1.0); which is also reflected in the current population. The historical population is summarized in table 4 and the specimen-wise details of the historical population are presented in Appendix I.



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

	Males	Females	Unknown	Total
Total studbook size	13	9	4	26
Total number of acquisitions from wild	5	1	0	6
Total number of hatches	7	8	4	19
Total number of unknown origin individuals	1	0	0	1
Total number of deaths	5	5	4	14
Total number of lost to follow up (Ltf)	2	0	0	2
Total number of known breeding individuals	0	0	0	0

### Living Population

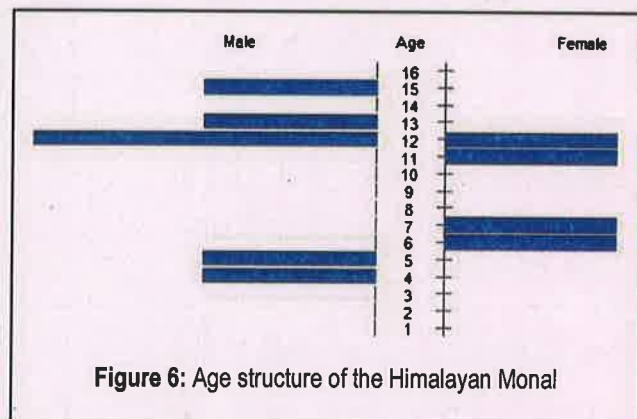
The living population consists of a total of 10 (6.4.0) individuals including 1 unknown origin, 2 wild-born and 7 captive-born individuals. The living population is summarized in table 5 and details are presented in Appendix II.

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

	Males	Females	Unknown	Total
Total no. of living individuals	6	4	0	10
Total number of wild-born individuals	2	0	0	2
Total number of captive-born individuals	3	4	0	7
Total number of unknown origin individuals	1	0	0	1
Total number of known breeding individuals	0	0	0	0

### Age Distribution

The ages of 6 out of the 10 living individuals were not known; however, the minimum age of the birds was calculated based on the dates of entry in the institutions, and is depicted in the age structure (Figure 6). The age structure of the current population is relatively old with a bias towards males. The absence of specimens in the lower age classes is indicative of absence of fresh recruitments



**Figure 6:** Age structure of the Himalayan Monal

occurring in the population and a declining population. An assessment of the population revealed that Padmaja Naidu Himalayan Zoological Park, Darjeeling and Himalayan Nature Park, Kufri hold four (2.2) specimens each however the specimens at Darjeeling are in their senescence except for a female hatched in 2010, while Kufri houses two (1.1) specimens in the reproductive age classes. These are inadequate for maintaining a self-sustaining population of the species in captivity.

### Limitations to data analysis

Further demographic and genetic analysis of the data was precluded by the limited information available from holding zoos with reference to parentage records and birth dates.

## **Conclusions and Recommendations**

Himalayan Monal, listed in Schedule I of the Wildlife (Protection) Act 1972 is facing local declines primarily due to habitat fragmentation and deterioration and poaching. Maintaining insurance populations of this charismatic species thus becomes imperative. Analyses of the Indian captive population based on available records; however, indicates a small population size that is continuing to decline. The specimens representing the species in captivity are of unknown parentages, information that is crucial to genetic management of populations in *ex-situ* programs.

The maintenance of self-sustaining captive populations can be achieved by:

A self-sustaining population of the species in captivity can be achieved by supplementation of the captive population with specimens acquired from wild for ensuring availability of adequate breeding pairs. The genetic management of the population can be initiated after ensuring reproductive success in the captive population.

The genetic management of the species in captivity would entail the determination of relatedness in captive specimens using molecular-genetics techniques for determining mating choices (between captive – captive and captive – wild specimens).

Provision of suitable habitat conditions in captivity for ensuring the welfare based on development of appropriate housing and husbandry practices for the species in captivity can aid in ensuring reproductive success in the species. These practices based on knowledge of natural history and biological requirements of the species in captivity can ensure reproductive success and rapid population growth in the population.

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## Appendix I

Historical Population of Himalayan Monal (*Lophophorus impejanus*)

Sl. No.	National Studbook No.	House name/ Local ID/ Ring No.	Sex	Hatch Date	Sire	Dam	Location	Date	Event
1.	00001	Unnamed	M	????	Unk	Unk	Kufri Darjeeling	???? 19-Jan-90 10-Mar-05	Hatch Transfer Death
2.	00002	Unnamed	F	????	Unk	Unk	Sarahan Kufri	???? 16-Aug-97 16-Jun-12	Hatch Transfer Death
3.	00003	Unnamed	M	????	Unk	Unk	Sarahan Kufri	???? 02-Jul-01	Hatch Transfer LTF
4.	00004	Manu 42D04R1166AI	M	~ Dec-00	Wild	Wild	India Kufri	30-May-02 30-May-02	Capture Transfer
5.	00005	Unnamed	M	????	Wild	Wild	India Nainital	15-Jun-03 15-Jun-03 17-Jun-03	Capture Transfer Death
6.	00006	Unnamed	M	????	Wild	Wild	India Nainital	15-Jun-03 15-Jun-03 20-Jun-03	Capture Transfer Death
7.	00007	Unnamed	F	????	Wild	Wild	India Nainital	15-Jun-03 15-Jun-05 21-Aug-05	Capture Transfer Death
8.	00008	Unnamed	M	????	Wild	Wild	India Nainital	14-Jul-03 14-Jul-03 24-Jan-04	Capture Transfer Death
9.	00009	Unnamed B00097	M	~ 2004	Unk	Unk	Unknown Mysore	~ 2004 03-Dec-06	Hatch Transfer
10.	00010	Unnamed	F	????	Unk	Unk	Sarahan Kufri	???? 02-Mar-05 17-May-09	Hatch Transfer Death
11.	00011	Unnamed	F	????	Unk	Unk	Kufri Darjeeling	???? 23-Dec-04 23-Apr-05	Hatch Transfer Death
12.	00012	Unnamed 4203R1166AV1	M	????	Unk	Unk	Kufri Darjeeling	???? 23-Dec-04 19-Aug-11	Hatch Transfer Death
13.	00013	Unnamed 4199R1166AV1	M	????	Unk	Unk	Kufri Darjeeling	???? 23-Dec-04	Hatch Transfer
14.	00014	Unnamed	F	????	Unk	Unk	Kufri Darjeeling	???? 23-Dec-04 12-Apr-11	Hatch Transfer Death
15.	00015	Unnamed 4196R1166AV1	F	????	Unk	Unk	Kufri Darjeeling	???? 23-Dec-04	Hatch Transfer
16.	00016	Unnamed CB/CZA/INDIA/070432	M	????	Unk	Unk	Kufri Darjeeling	???? 23-Dec-04	Hatch Transfer

Sl. No.	National Studbook No.	House name/ Local ID/ Ring No.	Sex	Hatch Date	Sire	Dam	Location	Date	Event
17.	00017	Unnamed	M	17-Jun-05	Unk	Unk	Darjeeling	17-Jun-05	Hatch LTF
18.	00018	Unnamed	F	????	Unk	Unk	Sarahan Kufri	???? 02-Jul-05	Hatch Transfer
19.	00019	Unnamed CB/CZA/INDIA/070431	F	3-Jun-10	Unk	Unk	Darjeeling	03-Jun-10	Hatch
20.	00020	Unnamed	?	3-Jun-10	Unk	Unk	Darjeeling	03-Jun-10 08-Jun-10	Hatch Death
21.	00021	Unnamed	?	3-Jun-10	Unk	Unk	Darjeeling	03-Jun-10 13-Jun-10	Hatch Death
22.	00022	Unnamed	F	1-Jul-10	Unk	Unk	Kufri	01-Jul-10	Hatch
23.	00023	Unnamed	M	????	Unk	Unk	Sarahan Kufri	???? 26-Oct-12	Hatch Transfer
24.	00024	Unnamed GP/M/PD/11/GTK/1	M	????	Wild	Wild	India Gangtok	11-Mar-12 11-Mar-12	Capture Transfer
25.	00025	Unnamed	?	1-Jun-13	Unk	Unk	Darjeeling	01-Jun-13 10-Aug-13	Hatch Death
26.	00026	Unnamed	?	3-Jun-13	Unk	Unk	Darjeeling	03-Jun-13 01-Jul-13	Hatch Death
<b>TOTALS: 13.9.4 (26)</b>									

## Appendix II

### Living Population of Himalayan Monal (*Lophophorus impejanus*)

Sl. No	National Studbook No.	House Name /Local ID/ Ring No.	Sex	Hatch Date	Sire	Dam	Location	Date	Event
<b>Darjeeling- Padmaja Naidu Himalayan Zoological Park</b>									
1.	00013	Unnamed 4199R1166AV1	M	????	Unk	Unk	Kufri Darjeeling	???? 23-Dec-04	Hatch Transfer
2.	00015	Unnamed 4196R1166AV1	F	????	Unk	Unk	Kufri Darjeeling	???? 23-Dec-04	Hatch Transfer
3.	00016	Unnamed CB/CZA/INDIA/070432	M	????	Unk	Unk	Kufri Darjeeling	???? 23-Dec-04	Hatch Transfer
4.	00019	Unnamed CB/CZA/INDIA/070431	F	03-Jun-10	Unk	Unk	Darjeeling	03-Jun-10	Hatch
<b>Totals: 2.2.0 (4)</b>									
<b>Gangtok- Himalayan Zoological Park</b>									
5.	00024	Unnamed GP/M/PD/11/GTK/1	M	????	Wild	Wild	India Gangtok	11-Mar-12 11-Mar-12	Capture Transfer
<b>Totals: 1.0.0 (1)</b>									
<b>Kufri- Himalayan Nature Park</b>									
6.	00004	Manu 42D04R1166AI	M	~ Dec 2000	Wild	Wild	India Kufri	30-May-02 30-May-02	Capture Transfer
7.	00018	Unnamed	F	????	Unk	Unk	Sarahan Kufri	???? 02-Jul-05	Hatch Transfer
8.	00022	Unnamed	F	01-Jul-10	Unk	Unk	Kufri	01-Jul-10	Hatch
9.	00023	Unnamed	M	????	Unk	Unk	Sarahan Kufri	???? 26-Oct-12	Hatch Transfer
<b>Totals: 2.2.0 (4)</b>									
<b>Mysore- Sri Chamarajendra Zoological Garden</b>									
10.	00009	Unnamed B00097	M	~ 2004	Unk	Unk	Unknown Mysore	~ 2004 03-Dec-06	Hatch Transfer
<b>Totals: 1.0.0 (1)</b>									
<b>TOTALS: 6.4.0 (10)</b>									
<b>4 Institutions</b>									





Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00005

WILD

WILD



Sex: Male  
Hatch Date: ????  
Last Location: NAINITAL (dead)  
House Name:  
Tattoo:  
Tag/Band:

Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00006

WILD

WILD



Sex: Male  
Hatch Date: ????  
Last Location: NAINITAL (dead)  
House Name:  
Tattoo:  
Tag/Band:

Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00007

WILD

WILD



Sex: Female  
Hatch Date: ????  
Last Location: NAINITAL (dead)  
House Name:  
Tattoo:  
Tag/Band:

Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00008

WILD

WILD



Sex: Male  
Hatch Date: ????  
Last Location: NAINITAL (dead)  
House Name:  
Tattoo:  
Tag/Band:

Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00009

UNK

UNK



Sex: Male  
Hatch Date: ~ 2004  
Last Location: MYSORE  
House Name:  
Tattoo:  
Tag/Band:

=====  
Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00010  
=====

UNK UNK  
Sex: Female  
Hatch Date: ????  
Last Location: KUFRI (dead)  
House Name:  
Tattoo:  
Tag/Band:  
dam \ / sire  
00010

=====  
Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00011  
=====

UNK UNK  
Sex: Female  
Hatch Date: ????  
Last Location: DARJEELIN (dead)  
House Name:  
Tattoo:  
Tag/Band:  
dam \ / sire  
00011

=====  
Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00012  
=====

UNK UNK  
Sex: Male  
Hatch Date: ????  
Last Location: DARJEELIN (dead)  
House Name:  
Tattoo:  
Tag/Band: 4203r1166av16hp  
dam \ / sire  
00012

=====  
Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00013  
=====

UNK UNK  
Sex: Male  
Hatch Date: ????  
Last Location: DARJEELIN  
House Name:  
Tattoo:  
Tag/Band: 4199r1166av16hp  
dam \ / sire  
00013

=====  
Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00014  
=====

UNK UNK  
Sex: Female  
Hatch Date: ????  
Last Location: DARJEELIN (dead)  
House Name:  
Tattoo:  
Tag/Band:  
dam \ / sire  
00014

Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00015

UNK

UNK



Sex: Female  
Hatch Date: ????  
Last Location: DARJEELIN  
House Name:  
Tattoo:  
Tag/Band: 4196R1166AV16HP

Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00016

UNK

UNK



Sex: Male  
Hatch Date: ????  
Last Location: DARJEELIN  
House Name:  
Tattoo:  
Tag/Band:

Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00017

UNK

UNK

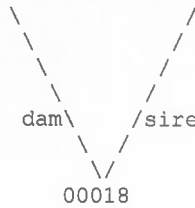


Sex: Male  
Hatch Date: 17 Jun 2005  
Last Location: DARJEELIN  
House Name:  
Tattoo:  
Tag/Band:

Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00018

UNK

UNK



Sex: Female  
Hatch Date: ????  
Last Location: KUFRI  
House Name:  
Tattoo:  
Tag/Band:

Taxon Name: LOPHOPHORUS IMPEJANUS Studbook Number: 00019

UNK

UNK



Sex: Female  
Hatch Date: 3 Jun 2010  
Last Location: DARJEELIN  
House Name:  
Tattoo:  
Tag/Band:





=====  
Taxon Name: LOPHOPHORUS IMPEJANUS

Studbook Number: 00025  
=====

UNK

UNK

dam \ / sire  
00025

Sex: Unknown  
Hatch Date: 1 Jun 2013  
Last Location: DARJEELIN (dead)  
House Name:  
Tattoo:  
Tag/Band:

=====  
Taxon Name: LOPHOPHORUS IMPEJANUS

Studbook Number: 00026  
=====

UNK

UNK

dam \ / sire  
00026

Sex: Unknown  
Hatch Date: 3 Jun 2013  
Last Location: DARJEELIN (dead)  
House Name:  
Tattoo:  
Tag/Band: