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Successful hand-rearing of a newly born orphaned wild common leopard cub (*Panthera pardus fusa* Linnaeus, 1758) at north Bengal wild animals park, West Bengal: A case study

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Abstract

A newly born wild common leopard cub was rescued under severely distressed conditions and was successfully hand-reared at North Bengal Wild Animals Park, West Bengal till the animal attained good health and was shifted to another facility adjacent to the veterinary hospital of the park. The quantity and type of feed provided were dynamically adjusted based on the cub's nutritional requirements, preferences and health conditions. The present paper sheds light on scientific management and husbandry practice employed, outlines challenges encountered, conservation strategy, and elucidates measures taken to address these challenges facilitating the successful hand-rearing of the leopard cub.

Keywords: Common Leopard cub, rescued, orphan, hand-rearing

1. Introduction

Zoos around the world are associated with Ex-situ conservation of wildlife under a scientific management system, animal welfare, education, research, and recreation. Both the National Zoo Policy, 1998, and the 'Recognition of Zoo Rules, 2009' in India address the role of zoos in wildlife conservation and management, including serving as rescue centres for wild and vulnerable wildlife (Mohapatra *et al.* 2019) [8]. Wild animals are generally rescued under fragile health conditions. In most cases, hand rearing appears as an emergency measure and the only option in zoos to raise rescued orphaned babies, especially those belonging to altricial placental mammals which are born helpless with closed eyes and ears. Altricial neonates also generally start off with poorer motor abilities and less coordination compared to precocial species (Jamon 2006) [6] and require significant care and development after birth. Hand rearing aims to save orphaned wild babies or vulnerable new-borns that cannot be taken care of by mothers (Mohapatra *et al.* 2019) [8] and it becomes a challenging task to save the life of a newly born orphaned baby with acute illness when altricial species are concerned. This paper reports the successful hand-rearing of an altricial species, a newly born rescued orphaned Leopard cub (*Panthera pardus fusa* Linnaeus, 1758) a few hours old at North Bengal Wild Animals Park, India. We also document medical issues, dietary management, and enrichment issues of hand rearing of rescued leopard neonates having poor chances of survival. Our observations and findings throw some light on operational procedures to be dealt with when similar situations come into existence in the future.

Three newly born leopard cubs were spotted along with their mother who died of a snake bite at a tea garden of Ghospukur Range of Kurseong forest division. Out of three cubs, one was found dead and the rescue team moved two cubs to the veterinary hospital of North Bengal Wild Animals Park on 18 May 2023. One cub succumbed to death during transportation and the third one was in critical health conditions with symptoms of hypothermia, weakness, and dehydration.

2. Materials and Methods

The only surviving cub (Image 1 and Image 2) was hand-reared at North Bengal Wild Animals Park, Siliguri for 28 weeks after arrival and is presently kept in an enclosure adjoining the veterinary hospital of the park (Image 5 and Image 6). General body conditions including rectal temperature (Fahrenheit °F), heart rate per minute, and respiration rate per minute were examined. The cub was weighed. Following the guidelines of the Central Zoo Authority, India (Mohapatra *et al.* 2019) [8], about 10 ml of electrolytes were provided to the cub in a sterilized bottle, that was held in a slanting position to avoid choking. Subsequently, the cub was transferred to a cage that was padded with blankets. A heater was placed about 20 feet from the cage to provide warmth to the animal and prevent hypothermia during night. At all times, strict hygiene protocols and round-the-clock monitoring were upheld. A comprehensive dietary regimen (Table 1) was implemented, and the corresponding progression in body weight over time was recorded (Table 2).

From the second day onwards, an initial volume of 80 ml of formula milk was introduced, and this dosage underwent successive increments and adjustments till 59 days, as detailed in Table 1. The cub was provided with formula milk every three hours and at three months of age, milk was substituted by chicken soup initially, followed by chicken flesh. Commencing from the 12th week, the frequency of feed provision was reduced to twice daily, in the morning and evening hours. To avoid boredom, chicken soup, and beef soup were alternated from 27 weeks onwards in between major meals. Multivitamins and calcium supplements were also provided orally. Routine stool tests for gastrointestinal parasite prevalence were also screened using standard protocols (Jakher *et al.* 2020) [5].

Ethical approval was not required for the hand-rearing of the leopard cub which was carried out in the veterinary hospital of North Bengal Wild Animals Park, Siliguri as a routine veterinary practice. This institution is a state government-operated facility under the governance of the West Bengal Zoo Authority, India, catering to rescued and captive wild animals. It is important to note that the hospital adheres strictly to the highest standards of animal welfare, ensuring that no wild animals suffer mistreatment or harm. The protocol and procedures of the animal handling were ethically reviewed.

3. Results

Hand rearing of wild neonates is relatively challenging, but for saving the bereaved wild infants in future, proper documentation and the case study can play a vital role. Three orphaned Leopard cubs were rescued from a tea garden of Ghospukur Range of Kurseong forest division whose mother died due to snake bite. One among them with severe critical health care condition was hand-reared. Data were taken up to 28 weeks age of the cub. Day to day report of daily feed intake, change in diet and rate of consumption and changes in body weight were recorded. Different health issues were also addressed successfully and documentation was done.

On the day of arrival, the rectal temperature recorded was 98.5 °F, accompanied by heart and respiration rates of 59 beats/minute and 10 breaths/minute respectively. Subsequent monitoring and treatment improved rectal temperature (101.2°F), heart rate (65 beats/minute), and respiration rate (12 breaths/minute) to normal. Although the cub's eyes remained closed, it was responsive to auditory stimulations

and showed no external injuries suggesting that it was aware of its surroundings and its health was stable (Sabapara 2008, Aniruddha and Athreya 2010) [1]. Notably, the eyes opened after 10 days of arrival, which was in accordance with the expected time frame for leopard cubs (Archarjyo and Misra 1972) [2]. The cub weighs 420 gm and sex was determined as female.

The cub showed a consistent pattern of normal growth. However, in the 20th week (Image 3), mild lameness was noted. Radiography revealed low bone density. In response to these health challenges, calcium supplements (5 ml for 30 days) and multivitamin syrup (5 ml for 15 days) were provided orally. The cub was exposed to early morning and evening sunlight (two hours duration) regularly. All the medications were given to the cub by mixing with its feed. With the implementation of these interventions, the health issues gradually improved.

With regards to gastrointestinal parasites, mild infection with *Ancylostoma* spp was detected in the 23rd week. Broad spectrum dewormers with active ingredients like Pyrantal embonate and Febantol (7.5ml/day for 1 day) were administered orally. Vaccination against panleukopenia, calicivirus, feline herpesvirus and rabies (Biofel PCHR) was also provided at 90 days and repeated after 120 days.

By the 28th week of hand-rearing (Image 4), the cub relocation to a dedicated enclosure adjacent to the veterinary hospital. Displaying exceptional vigilance, energy, acrobatic prowess, and high sensitivity to auditory and olfactory stimuli, the cub's well-being was prioritized. Enrichment activities, including the provision of a wooden ball and platforms, were introduced to encourage playful behaviour. Live fish was also introduced as a part of the feed enrichment. Strict and thorough cleaning and sanitation procedures were consistently followed for all equipment and shelters.



Fig 1: Newly rescued wild leopard cub showing signs of dehydration and weakness, being monitored at the veterinary hospital of North Bengal Wild Animals Park



Fig 2: Close-up image of the leopard cub receiving electrolyte solution through a sterilized feeding bottle to combat dehydration and weakness

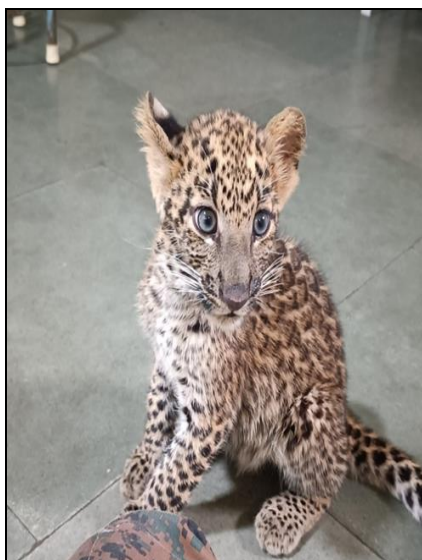


Fig 3: Leopard cub at 20 weeks showing mild lameness, undergoing radiographic examination to assess bone density

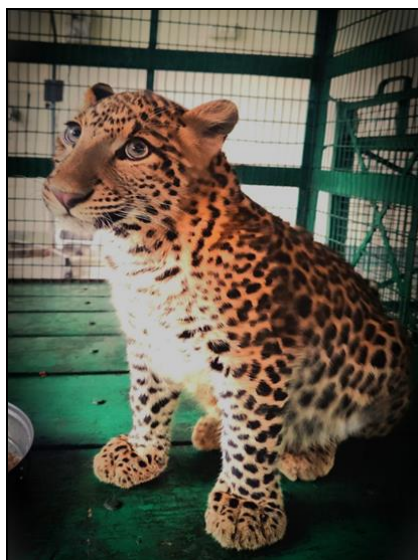


Fig 4: The leopard cub at 28 weeks after successful recovery, displaying normal growth and activity in the dedicated enclosure adjacent to the veterinary hospital



Fig 5: Veterinary staff at North Bengal Wild Animals Park performing regular health check-ups and feeding the leopard cub to ensure proper care and nourishment



Fig 6: The final enclosure setup for the leopard cub, featuring enriched environmental elements to promote natural behaviors and physical activity

Tables

Table 1: Animal feeding regime with medication details

Age in week	Total quantity of milk consumed in ml	The total quantity of chicken soup consumed (in ml)	Total quantity of beef soup consumed (in ml)	The total quantity of minced chicken consumed (in gm)	Average Frequency of feeding/day	Remarks
1	440	-	-	-	6	
2	930	-	-	-	5	
3	1285	-	-	-	4	
4	1560	-	-	-	4	
5	1175	-	-	-	4	
6	1400	-	-	-	5	
7	1330	-	-	-	4	
8	1630	-	-	-	4	
9	1835	-	-	-	4	
10	1820	495	-	-	4	
11	800	1780	-	570	4	
12	570	1935	-	1185	4	
13	-	1850	-	1965	2	
14	-	2090	-	2300	2	
15	-	2190	-	2800	2	
16	-	2540	-	3100	2	
17	-	2800	-	4200	2	
18	-	2600	-	4250	2	
19	-	1700	-	4000	2	Constipation reported. The Bisacodyl rectal paste was applied around the rectal and Lactulose

						syrup (2ml/1 day) was given for relief. Calcium and multivitamin supplements were given.
20	-	1350	-	3120	2	Calcium and multivitamin supplements were provided. Exposure to sunlight between 8-10 am.
21	-	410	-	3500	2	
22	-	860	-	5410	2	
23	-	1300	-	5640	2	Pyrantal embonate and Febantal were provided (7.5ml/day for 1 day).
24	-	1350	-	5710	2	
25	-	1350	-	5780	2	
26	-	1400	-	6970	2	
27	-	900	400	6360	2	Vaccination against panleukopenia, calicivirus, feline herpesvirus, and rabies was done.
28	-	500	800	5400	1	

Table 2: Records of body weight

Age in week	Weight recorded (in gm)	Increase in weight (in gm)
1	600	120
2	740	140
3	1180	440
4	1560	380
5	1850	290
6	2140	290
7	2520	380
8	2925	405
9	3220	295
10	3460	240
11	3560	100
12	3740	180
13	3965	225
14	4220	255
15	4440	220
16	5200	760
17	5640	440
18	6100	460
19	6140	40
20	7300	1160
21	7380	80
22	8000	620
23	8740	740
24	8840	100
25	9300	460
26	9420	120
27	10660	1240

4. Discussion

Numerous authors have documented the successful hand-rearing of various wild animal species elsewhere (Dhoot *et al.* 2000, Najera *et al.* 2011, Komnenou *et al.* 2016, Arun *et al.* 2020, Shalini *et al.* 2023) [4, 9, 7, 3, 11]. Close observation, behavioural study and immense patience and perseverance are the key to successful hand rearing of wild neonates. Throughout the entire rearing process, a notable and inseparable bond developed between the cub and its dedicated keepers. It has been decided that social enrichment and behavioural enrichment would be executed in the coming months and human footprints would be minimized as far as practicable to maintain the cub's wild instincts. The authors aspire that the insights shared in this paper prove valuable to zoo veterinarians engaged in the hand-rearing of species facing similar or closely related challenges under unfortunate circumstances.

5. Conclusion

The present paper sheds light on scientific management and husbandry practice employed, outlines challenges encountered, conservation strategy, and elucidates measures taken to address these challenges facilitating the successful hand-rearing of a leopard cub. This gives an insight on the

gradual change in body weight of leopard cub in captive environment as well as change in feeding regime and supplements based on that. Gastrointestinal parasitic infestation is seen in the cubs of the lesser cats as well as big cats, so this paper can also be suggestive in treating such medical conditions.

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7. Statements and Declarations

- **Competing Interests/Conflict of interest:** The authors declare that they have no conflict of interest with respect to the publication of this article.
- **Financial Support/Fundings:** The authors declare that no external funding or grants were received for this study. This study was conducted as part of routine operations at the zoological Park.

8. Author Contributions

ND: Treatment and establishing husbandry protocol; PP: Assisting in hand rearing of the cub, data compilation and manuscript writing; EVK: Administrative support; KS: Administrative support; AC: Editing of manuscript and animal husbandry practice; SS: Discussion of manuscript and editing; ID: Conceptualization of work and final editing of the manuscript, IC: Data compilation and manuscript writing.

Conflict of Interest

Not available

Financial Support

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