Successful Breeding and Hand Rearing of Jaguar cub *Panthera onca* in the National Zoological Park, New Delhi

N. Panneer Selvam[1], B.S. Bonal[2] and R.K. Sharma[3]

Introduction

National Zoological Park, New Delhi had received a pair of Jaguar *Panthera onca* (1:1) from Sri Lanka Zoo in exchange programme on 9.2.1999, of five-and-a-half years old and 2 years old respectively. They were named as Sunder and Sunderi. The cage allocated them in the National Zoological Park had furniture of wooden logs and vegetation to suit them somewhat to their natural habitat and both the animals have adopted to the zoo climate and environment. The female conceived and delivered cubs in due course. But unfortunately, it had happened thrice that inspite of our best efforts, the cubs died. Hence it was decided to hand rear the forthcoming cubs at the veterinary hospital of the National Zoological Park, New Delhi

History

In the National Zoological Park, New Delhi the new inmate Sunderi deliverd cubs as follows:

Date	No. of cubs	Fate of cubs
3.12.2000	2 male cubs	killed by mother
24.1.2002	3 cubs	2 killed by mother 1 died
1.4.2003	1 cub	died of gastroenteritis
26.11.2003	2 cubs	1 died, 1 alive and hand reared and named “Sony”

In her first attempt, Sunderi gave birth to two cubs on dated 3.12.2000 but unfortunately she did not lick and suckle the cubs. Instead, she mauled the cubs and killed them showing the tendency of cannibalism. On the second occasion Sunderi again delivered two cubs on 24.2.2002 wherein two cubs again were killed by the mother and one died. On 1.4.2003 again one cub was born to Sunderi. The cub was hand reared but after survival of one and half month it died of gastroenteritis. On 26.11.2003, Sunderi again gave birth to two cubs. The first cub born at 1.40 A.M. and second at 4.45 A.M. The first one could not survive. The second cub, was separated immediately from the mother and brought to the veterinary hospital.

A search for a lactating bitch was made in advance that could have colostrum. Fortunately one such bitch was found available in “Friendecos” an animal welfare organization.

The bitch and her two own pups were brought to the zoo on 27.11.2003 onwards direct feeding of the cub with bitch’s nipples began. It was assumed that bitch milk alone was not sufficient for the growing cub as the bitch had to lacate her own pup also. One goat was also arranged to provide adequate quantity of milk to the cub alongwith the bitch milk. The feeding quantity of goat as well as bitch milk and frequency of feeding is summarized in table 1. The quantity of milk increased gradually as per the gain in body weight. The cub was kept in a wooden box of size 5.3 x 3.3 x 3 feet. After feeding the perineal region was wiped in a circular fashion with warm water soaked cotton to stimulate defecation reflex.

During initial two weeks, the frequency of milk provided was six times a day at an interval of three hours and from fourth week onwards the frequency was reduced to five times a day. Every precaution of sanitation, hygiene, temperature was continuously monitored to keep an eye on any infection. The feeding bottle and nipple was thoroughly washed and sterilized before each feeding. Urine and faeces was also checked on weekly basis to check for endoparasitic infection.

Some important feeding observations noted during the study:

1st Day	First feed of goat milk 5 ml at 6.00 A.M. It was followed by bitch milk directly from the bitch” teats at 12.00 P.M. and at 3.00 P.M. as it was not certain how much quantity of milk is consumed by the cub hence 15 minutes feeding was continued. At 9.00 A. M. and 5.00 P. M. 15ml goat milk and at 9.00 P. M. with15ml goat milk and one drop of Septran syrup given.
3rd Day	One drop of Septran syrup added to goat milk at 6.00 A. M. and 9.00 A.M. feed.
22nd Day	2 drops of Septran syrup added in goat milk provided at 6.00 A.M. feed Bitch milk not available hence, stopped.
29th Day	5ml milk provided in earthern pot (*Kundi)* which the cub had consumed comfortably. 3 drops of Oestocalcium syrup given alongwith goat milk.
33rd Day	Quantity of milk increased to 60ml and 10ml in steel plate. Frequency of milk reduced to 4 times a day. At first feed of the day at 6.00 A. M. 3 to 4 drops of Oestocalcium was also added.
35th Day	Quantity of milk increased to 65ml and 15ml in steel plate. At first feed at 6.00 A. M. half tea spoon of Gripe water.
37th Day	3ml of trip Gripe water and 2 drops of ABDEC drops multi vitamin at first feed.
47th Day	100ml goat milk in Kundi at 6.00, 11.00 A.M., 4.00, & 9.00 P.M. 5ml Chicken soup given which was very well consumed by the cub.
54th Day	Quantity of goat milk increased to 120ml. Chicken soup - 50ml and chicken meat (boiled) - 20gms at 1 P.M.

[1] Veterinary officer, [2] Director, [3] Laboratory Assistant, National Zoological Park, New Delhi, India

Chicken soup 50 ml again at 4 P.M.
Goat milk 120 ml with 3 ml Gripe water.

71st Day At first fed chicken meat (Boiled) - 200gms and 350ml soup
Boiled Chicken (boiled)- 50gms

112th Day Full chicken (boiled) - one
Boiled Chicken, beef - 500gms
Soup - 400ml.

127th Day Raw chicken (Raw) - one
Boiled Chicken, beef - 500gms
Soup - 400ml

131st Day Live fowl - one
Boiled Chicken, beef - 1kg.

Apart from its diet records, the other growth parameters, *i.e.* body size, body weight, and height were also recorded at weekly basis and summarized in table 2 and consequently plotted on graph for further evaluation.

Supplements:
- Septran syrup (1-22days) with a gap of 3 days intervals after 5 days.
- Oestocalcium (29-34 days)
- Gripe water (35-54) days)
- Abdec drops (37-54 days)

Some important observations during development of the cub:
- Passed urine frequently but defecation was only by stimulating the perineal region.
- Eyes were open from the first day onward but eye sight shown after 15 days.
- Incisor teeth appeared on 30th day.
- Able to defaecate by herself on 32nd day.
- Swelling in upper gums for canine teeth appeared on 37th day
- Swelling in lower gums for canine appeared on 40th day.
- Bitch milk discontinued on 22nd day due to no lactation.
- During lactating directly from the teats the bitch was found always docile and even sometimes licked the cub also alongwith her own one pup.

Discussion
Hand rearing of jaguar *Panthera onca* from first day of birth onward on a new formula of bitch milk having colostrum and goat milk is supposed to be first of its kind in the Indian zoos as no Indian zoo has yet reported such experiment.

The selection of bitch is a crucial factor. It is because no other milk except mother's own milk can provide colostrums which is an essential requirement in the early few days of birth. Colostrum provides immunity to the body against disease in addition to its other vital role. The bitch in this case was selected who had delivered pups on the same day as Sunderi *i.e.,* 26.11.2003.

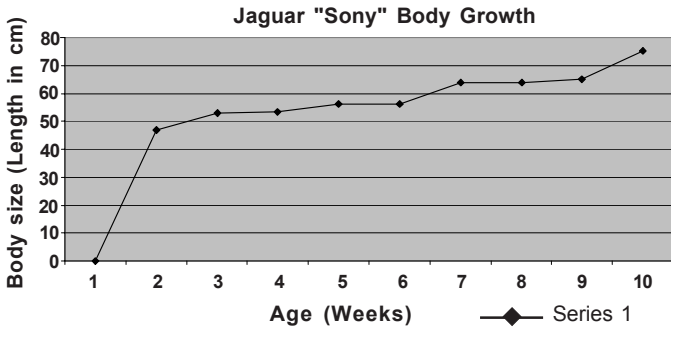
Graphical analysis of growth:
Body length: The length of the body in the second week of age was 47cm which gradually increased and at the age of

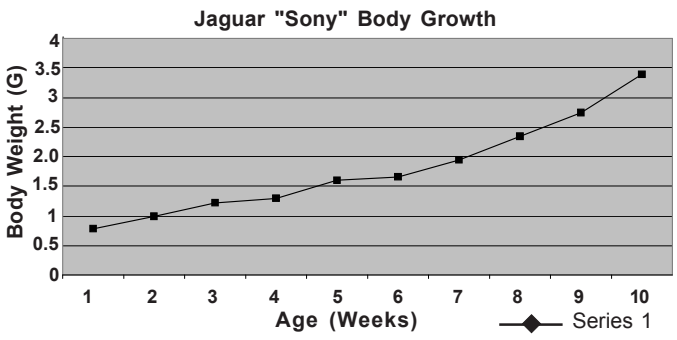
Table 1. Feeding chart

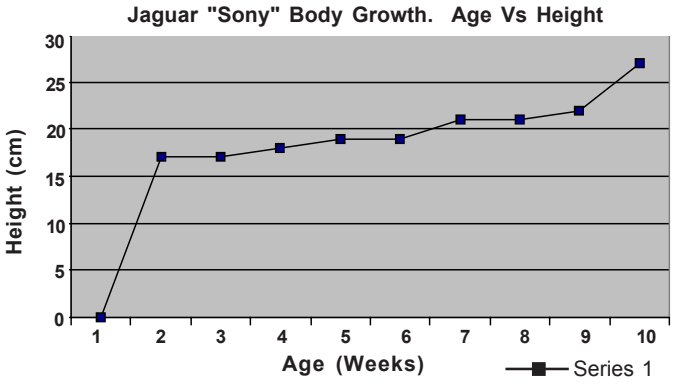
Age (Weeks)	Milk Consumed (ml) Goat	Bitch	Chicken (gm)	Chicken Soup (ml)	B.C. Meat (gm)	Total diet
1	45	30	00	00	00	75
2	60	30	00	00	00	90
3	75	45	00	00	00	120
4	150	45	00	00	00	195
5	282	00	00	00	00	282
6	350	00	00	00	00	350
7	350	00	00	00	00	350
8	300	00	00	00	00	300
9	320	00	00	00	00	320
10	260	00	00	00	00	260
11	385	00	16.6	45	00	-
12	305	00	115	85	00	-
13	43	00	350	450	00	-
14	00	00	400	750	85	-
15	00	00	400	770	255	-
16	00	00	500	800	200	-
17	00	00	215	800	550	-
18	00	00	300	500	470	-
19	00	00	Full chicken	343	360	-
20	00	00	Full chicken	800	500	-
21	00	00	Full chicken	-	1Kg	-
22	00	00	Full chicken	-	1Kg	-

Table 2. Growth parameters

Age (weeks)	Height (cm)	Body weight (Kg)	Body length (cm)	Foreleg (cm)	Hindleg (cm)	Girth (cm)	Tail (cm)
0	-	0.710	-	-	-	-	-
1	-	0.790	-	-	-	-	-
2	17	0.990	47	-	-	20	-
3	17	1.215	53.4	20.3	21.6	20.9	14
4	18	1.300	53.5	21	22	25	17
5	19.5	1.600	56	21.5	22.5	29	18
6	19.5	1.660	56	23.5	24	30	18.7
7	21	1.940	64	23.5	24	30	20.5
8	21	2.340	64	26	25	30	23
9	21.5	2.740	65	26.5	26	31	23
10	27	3.400	75	28	29	32	25







ten weeks it reached to 75cm.

Body weight: The body weight of the cub at the first week of age was 0.790g and at the age of 10 weeks it reached to 3.4kg.

Body height: The height of the cub at two weeks age was 17cm. It has been found that increase in height was not so rapid in the initial 9 weeks. It reached to 21.5cm at 9 weeks of age by gradual increase of 1 to 22cm in a week but it tremendously increased to 21.5cm at 10 weeks of age.

References

Arora, B.M. (2001). Guidelines for neonatal examination and nursery monitoring in wild mammals. In: Souvenir-first annual convention of association of all India zoo veterinarian and workshop, New Delhi. Pp. 70-73.

Batwe, K.D. (1988). Hand rearing of hyena in captivity. In: proceedings-First All India Zoo Veterinarian Seminar, Chandigarh, Pp. 133-136

Crandel, Lee S. (1966). In: A zoo man's notebook. The University of Chicago press, Chicago and London, Pp. 357.

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Zoos : An Instrument for Conservation

Vijaya Kumar*

One of the objectives of zoos is conservation education, apart from research and conservation. Zoos have ample opportunity to interact with visitors where conservation issues can be promoted to enlist the public support. Conservation education in zoos is not an easy task to convey to the public, unless everybody right from keeper to curator gets involved in this programme.

The Indira Gandhi Zoological Park, Visakhapatnam has chalked out a programme for training the executive staff to improve their communication skills and knowledge, and thereby turn visitors towards conservation goals.

The curriculum for conservation education includes explaining objectives of the zoo and species displayed, besides its unique features such as nutrition and health care management, etc. The visitors, irrespective of their age, enjoy learning near enclosures in a more informal way instead of in a closed atmosphere. Open learning of this type gives scope to learners' imagination.

The most effective subject to teach visitors is to explain in detail about zoo objectives in order to arouse their interest towards conservation aspects. Visitors thus may also appreciate efforts being put by the zoo management for the cause of conservation. Otherwise most of the visitors perceive zoo as mere entertainment or recreational centre.

One objective of the zoo is to breed species which are declining in the wild due to human causes. This zoo breeding should be done so that the population is genetically and socially viable. They should retain their natural instincts so that they may be reintroduced into natural habitat as per IUCN Reintroduction Guidelines. It is crucial that the reintroduced animals have the fitness to sustain the population for the long term, therefore health screening and study of the predetermined habitat is necessary.

Zoos are one of the only the places where there is scope for certain kinds of research on wild animals, such as some behavioural research and biological reproduction, nutrition, etc. It is very difficult to study these aspects in free ranging populations or wilderness area without destructive intrusion.

Additional curriculum subjects include ecosystem, food web, energy flow, nutrient recycling, hydrological cycle, and examples (such as cause of Dodo extinction) in order to make the connection between plants and animals in nature.

By seeing the response of educational programmes conducted our Zoological Park, Visakhapatnam extended our tentacles to outside the park. The outreach activity fetched a good response and improved the zoo in the year 2004-05.

In the end, we will conserve only what we love;
We will love only what we understand;
We will understand only what we are taught.

- Baba Dioum - Senegalese poet

*** Curator, Indira Gandhi Zoological Park, Vizak Andhra Pradesh, Ph: 2552081, 2771500 Email: vijayak68@rediffmail.com.**