

## RETROSPECTIVE STUDY ON REPRODUCTIVE PATTERNS OF LARGE WILD CATS IN CAPTIVITY

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Planned breeding, conservation, research and education are prime objectives of the zoological gardens/wildlife parks. To fulfill the objectives of planned breeding and conservation, it is important to study the breeding biology of a particular species in relation to environment, season, age, diet, geographic location and other managemental factors. In some zoos of our country we are over loaded with certain species of wild animals due to limited space while some are still deficient, so it is necessary to know the most suitable period of the year for breeding of these animals in different geographic locations. Based on it, a breeding programme is to be designed for individual species of wild animals. Since, tiger, lion and leopard are the major endangered species; a study of their reproductive pattern is worth noting. This study was undertaken to provide information on litter size, time of year/month most suitable for breeding vis-a-vis whelping and comparative proliferation rate of these animals. This paper is based on breeding data of tiger, lion and leopards collected at M.C.Z.P., Chhat Bir from 1989-2001. This zoo is located in Patiala district of Punjab near Chandigarh on Zirakpur-Patiala road. The geographic location of Patiala is 29°49'-30°47'N & 75°58'-76°54'E.

**Royal Bengal Tiger (*Panthera tigris*):** In this study we covered a total of 82 cubs born in 27 litters (3.04 cubs/litter) (Table 1); litter size ranged between 1 and 5 with a maximum probability of 2 cubs/litter (33.4%) (Table 2; Fig. 2). Das (1980) reported litter size of 1-5 (2.6 cubs/litter) of tigers at Calcutta Zoo with a maximum probability of 2 cubs/litter (41%). In the present study,

high percentage of births/whelpings was observed in April and May corresponding to high breeding activities in January and February (Table 1; Fig. 1). The tiger cubs were born throughout the year except in September and December, which may be correlated to lower breeding activities or poor conception rate in June and September. Das (1980) analyzed the breeding data of tigers belonging to Zoological Garden, Calcutta and documented that tigers mate throughout the year, hence cubs are produced during all seasons but high breeding activities occur in January, February, March, April, June and October months. From the species studbook of CZA by month of birth distribution analysis, maximum births were recorded in April and May (Arora, 2002a). Findings of the present study corroborate with Das (1980) and Arora (2002a).

**Lion (*Panthera leo*):** During the period of study a total of 93 hybrid lion cubs were born out of 27 litters (3.32/litter) (Table 1) and litter size ranged between 1 and 5 with a maximum probability of 3 cubs (35.7%) (Table 2; Fig. 2). Arora (2002b) reported the mean of 7 litters to be  $2.86 \pm 0.64$ . Average litter size at the Zoological Garden, Junagarh was recorded to be three but analysis of the Species Studbook (CZA, 1994-95) data revealed average litter size of 2.33 (Arora, 2002b). Similar to tigers, lion cubs were born throughout the year except in September and December. High percentage of births/whelpings occurred in July, January and April, which corresponds to high breeding activities in April, October and January (Table 1; Fig.1). Rashid and David (1992) reported that although lion matings are observed round the year, more matings are recorded in September and October months. It may be related to environmental or climatic variations.

**Leopard (*Panthera Pardus*):** During the period of study a total of 20 cubs were born out of 10 litters (2 cubs/litter) (Table 1). In leopard, there is higher probability of birth of 2 cubs/litter (50%) (Table 2; Fig. 2). In this study litter size ranged between 1 and 4. Desai (1975) analyzed a data of 39 litters in leopards at the National Zoological Park, New Delhi and recorded litter size of 1-3 (averaging 1.6 cubs/litter) with a maximum probability of 2 cubs/litter (51.3%). Litters of 1-6 (averaging 2.14 cubs/litter) were recorded at Biological Park Bhubaneshwar (Arora, 2002c).

**Table 1. Month birth distribution and total no. of litters in large wild felids**

Month	Cubs born					
	Tiger		Lion		Leopard	
	Cubs	Litters	Cubs	Litters	Cubs	Litters
January	03 (3.7)	01 (3.7)	15 (16.1)	05 (17.85)	01 (5.0)	01 (10.0)
February	04 (4.9)	02(7.4)	04 (4.3)	01 (3.6)	02 (10.0)	01 (10.0)
March	03 (3.7)	01 (3.7)	03 (3.2)	01 (3.6)	02 (10.0)	01 (10.0)
April	21 (25.6)	07 (25.9)	14 (15.1)	04 (14.3)	06 (30.0)	02 (20.0)
May	20 (24.4)	06 (22.3)	10 (10.75)	03 (10.7)	04 (20.0)	02 (20.0)
June	02 (2.4)	01 (3.7)	07 (7.5)	02 (7.1)	02 (10.0)	01 (10.0)
July	02 (2.4)	01 (3.7)	17 (18.3)	05 (17.85)	03 (15.0)	02 (20.0)
August	11 (13.4)	03 (11.1)	10 (10.75)	03 (10.7)	-	-
September	-	-	-	-	-	-
October	09 (11.0)	03 (11.1)	02 (2.2)	01 (3.6)	-	-
November	07 (8.5)	02 (7.4)	11 (11.8)	03 (10.7)	-	-
December	-	-	-	-	-	-
<b>Total</b>	<b>82 (100)</b>	<b>27 (100)</b>	<b>93 (100)</b>	<b>28 (100)</b>	<b>20 (100)</b>	<b>10 (100)</b>

Figures in parentheses indicate percentage

In the present study, high percentage of births/whelpings is observed in April and May corresponding to high breeding activities in January and February (Table 1; Fig. 1). These findings corroborate Arora (2002c) stating maximum percentage of births in June (17.8%), May (16.7%) and April (12.2%) months at Biological Park Bhubaneshwar. Desai (1975) observed leopard breeding throughout the year at National Zoological Park, New Delhi and recorded high percentage of births in July (17.9%), May (15.4%) and January (12.8%). But in this study no birth/whelping was recorded from August to December period of the year, which might be due to low sample size i.e. only two adult female leopards during this period.

This study concludes lion to be highly prolific animal followed by tiger and leopard. Based on the average litter size this geographic location and climate is more prolific for breeding activities of tigers and lions in comparison to other geographical locations referred in this study. At this location, tiger and lion breeds throughout the year but January and February are the highly breedable months for tigers and leopards (as indicated by the corresponding months of birth), while lions showed maximum breeding activity in April, October and January. So during these months breeding can be planned more efficiently.

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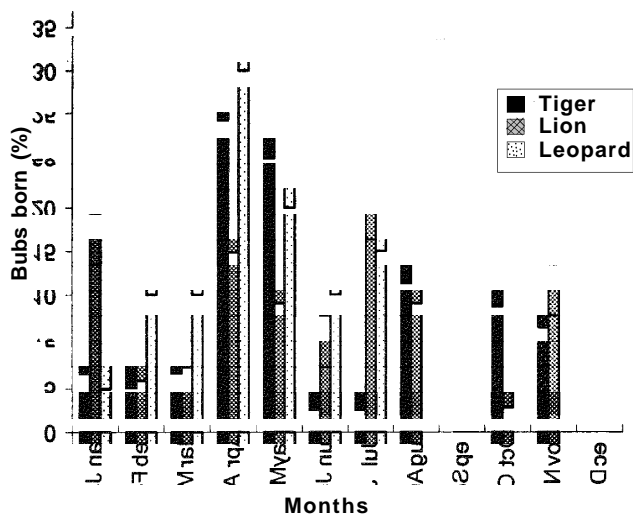
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**Table 2. Litter size versus no. of litters**

Litter size	Number of Litters		
	Royal Bengal Tiger	Lion	Leopard
01	02 (7.4)	02 (7.1)	03 (30.0)
02	09 (33.4)	04 (14.3)	05 (50.0)
03	06 (22.2)	10 (35.7)	01 (10.0)
04	06 (22.2)	07 (25.0)	01 (10.0)
05	04 (14.8)	05 (17.9)	-
<b>Total</b>	<b>27 (100)</b>	<b>28 (100)</b>	<b>10 (100)</b>

Figures in parentheses indicate percentage

**Figure 1. Comparative births of Large Wild Felids**



**Figure 2. Litter size versus number of whelpings**

