

Reproductive Behavior in Rhesus Monkey, *Macaca mulatta* (Zimmermann, 1758) in Bir Sonty Reserve Forest, Haryana (India)

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Abstract: The present study was carried out from February, 2008 to July, 2008 to record reproductive behavior of Rhesus monkey in Bir Sonty Reserve forest (BSRF), Haryana (India). Study of reproductive behavior among rhesus monkey Direct contact method (Barwer, 1971) was followed. Three troops of *Macaca mulatta* in Bir Sonti Reserve forest (T-I, T-II, T-III) were selected. In present study, it was observed that rhesus macaques show reproductive activity when female attain average age of 3 years and male attain average age of 5 years. During breeding period female spent more time with male and starts activity likes, proximity, reciprocal grooming, copulation, restlessness and excitement. Three types of reproductive activity i.e., present, mount and thrust performed by rhesus monkey was observed. During periodic visits it is observed that breeding among rhesus macaques occurred in all the year and female give to born new infants with an average mass 480 g. These infants seen in mostly in the month of February to next month of the year. During the present study, it was observed that number of infants in troop-I varied from 4 (February, 2008) to 8 (July, 2008), in troop-II varied from 7 (February, 2008) to 11 (July, 2008) and in troop-III varied from 6 (February, 2008) to 9 (July, 2008). It is estimated that addition of infants maximum 2 (May, 2008) in troop-I, 2 (June, 2008) of troop-II and 2 in (May, 2008) of troop-III.

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1. Introduction:

Rhesus monkey (*Macaca mulatta*) is an old world monkey belongs to Order- Primates, Family- Cercopithecidae, Genus- *macaca* and Species- *mulatta* (Wilson, 2007). Rhesus monkey has a major role in biodiversity and in medical biological study such as surrogate mother, immunodeficiency disease, captive breeding, blood grouping and sequence of genome etc. (Zahn *et al.*, 2007). Among mammals Primates, are the most complex- creatures, which appeared on the planet earth around 63 million years ago in Eocene period of Coenozoic era (Moody, 1962). Rhesus monkey is distributed ubiquitously throughout mainland Asia, from Afghanistan to India and Thailand to Southern China, Bangladesh, Bhutan, Nepal and Pakistan (Ferris *et al.*, 1980; Groves, 2001; Smith and Mc Donough, 2005). In India, it is found in good number in peninsular India (Assam, Madhya Pradesh and West Bengal), north India (Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Rajasthan, Gujrat) and central India (Orissa, Bihar) (Seth *et al.*, 2001). In Haryana, rhesus monkey is found in different habitats including villages, road side forest, towns, temples and near agricultural fields etc (Hunger, 2004). Rhesus macaques characterized by dusty brown in color with little to no fur on their reddish-pink faces.

Male and female are sexually dimorphic. Male have more red color on rump than female resemble with their faces. Average body length for female 207.6 mm and for male 227.9 mm. Average weight for male is 7.70 kg and for female is 5.34 Kg (Fooden, 2000; Singh and Sinha 2004).

2 Material and Methods

Study area

To study reproductive behavioral in rhesus monkey, *Macaca mullatta*, Bir Sonty Reserve Forest was selected as study site. Bir Sonty Reserve Forest (30° 0' E latitude and 77° 1' N longitude) is located on Kurukshetra-Ladwa link road around 20 km. towards East of Kurukshetra and spread over an area of 474.50 acres (fig. 1). Bir Sonty Reserve Forest is an artificial forest and contains majority of the cultivated plants. The area has dark colored, alluvial soil rich in organic matter and having high water retention capacity. The dominant fauna of Bir Sonty Reserve Forest includes avian species (*Anas poecilorghyncha*, *Arcidotheres tristis*, *Bubulcus ibis*, *Centropus sinsnsis*, *Culumbia livia*, *corvus splendens*, *Dinopium savanense*, *Egretta garzetta*, *Himantopus himantopus*, *Meropus orietalis*, *Passser domesticus*, *Pristuculla krameri*, *Phalacrocorax niger*, *Pycnonotus cafer*, *Primia gracilis*, *Streptopelia*

senegalensis, *Sturnus contra*, *Turdoides caudatus*, *Upipa epopus*), mammalian species (*Boselaphus tragocamelus*, *Sus scrofa*, *Felis sp.*, *Macaca mulatta*, *Funambulus pennanti*) and dominant flora includes *Acacia nilotica*, *Albizia lebbek*, *Butea monosperma*, *Eucalyptus sp.*, *Dalbergia sissoo*, *Prosopis juliflora*, *Morus alba*, *Ficus bengalensis*, *Ficus glomerata*, *Syzygium cumini* and many species of herbs and shrubs (Dagar *et al.*, 2001).

To study, reproductive behavior in rhesus monkey Direct contact method (Barwer, 1971) was followed. Three troops of *Macaca mulatta* in Bir Sonty Reserve forest (T-I, T-II, T-III) were selected (fig. 2). During periodic fortnightly visits (February, 2008 to July, 2008), each individual of selected rhesus macaques troops was monitored for performing reproductive behavioral activity. These activities noticed and collected data was later on statically analyzed.



Fig. 1 Bir Sonty Reserve Forest, Haryana (India).

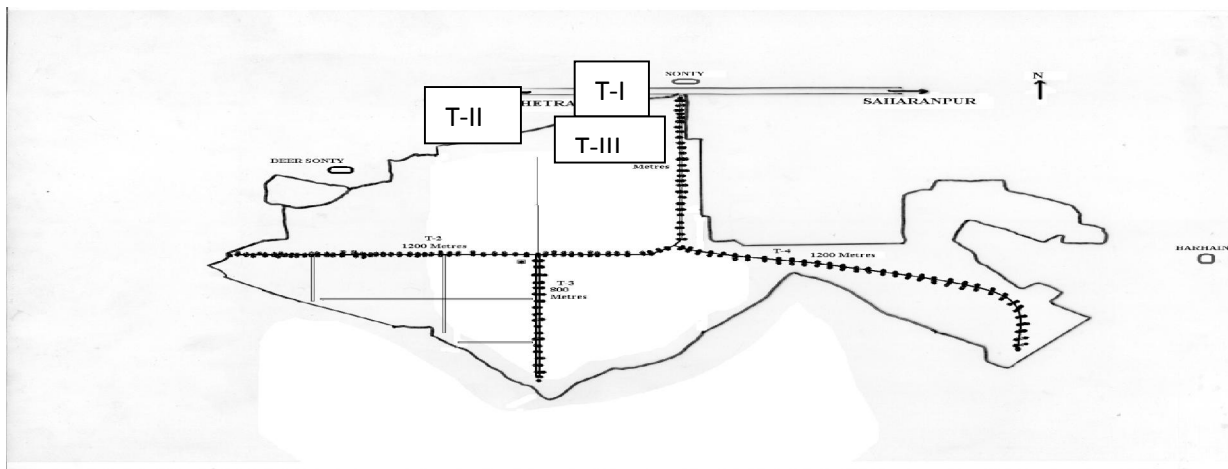


Fig. 2 Selected three troops of rhesus monkey in Bir Sonty Reserve Forest, Haryana (India).

3. Results and Discussion

Lindberg (1967) observed that reproduction among rhesus monkey occurred at the time of puberty, female attain age of 3 years and male attain age of 5 years and skin between hindquarter become redder in case of male, during the breeding season and female live closely related to male species. Loy (1970) also observed the reproduction occurred

among rhesus monkey age of 5 years (age of male is 5 years and female age is 3 years). He also observed the homosexual character among rhesus monkeys such as proximity, reciprocal grooming, copulation, restlessness and excitement. During the breeding season, female enter in to consortship with one or more males. An individual females will spend longer amount of time in contact with grooming and mating

with these males. Males and females rhesus macaques are promiscuous breeders, mating multiple times with multiple males (Lindburg, 1971).

Female reach puberty around age three years while males are sexually mature by age four years (Rawlins and Kessler, 1986). The ovarian cycle last for 28 days and are characterized by darkening of the skin surrounding the an genital region accompanied by menstruation (Catchpole and Van Wagenen, 1975). At Cayo Santiago, the mating season is much longer and began in July and last until December (Chapais, 1986). High ranking males have more opportunities to mate with females than low ranking males, but do not always sire a disproportionate number of infants. Lower ranking males may have similar reproductive success compared to high ranking males because they are new immigrants and are more attractive to females because of this (Berrard, 1999). From of one breeding season to the next, females will drastically reduce the amount of mating they do with familiar males and over a period of 3 years, they try not to mate with any familiar males given the opportunity to mate with unfamiliar males (Bercovitch, 1997; Berrard, 1999). Marc (2004) observed that female rhesus monkey, *Macaca mulatta* call honest (sweet voice) to male for reproduction and observed that these signal is less developed among male primates.

Phelps *et al.* (2006) also observed that some signal is produced among rhesus monkey help in the mating. During the reproduction of the signal male attract toward female and also observed that female have no sexual swelling skin but the peripheral area shows cyclic in ovulation, become bright red around the time of ovulation. Joshua (2008) observed the reproductive physiology among rhesus monkey. He observed that reproductive

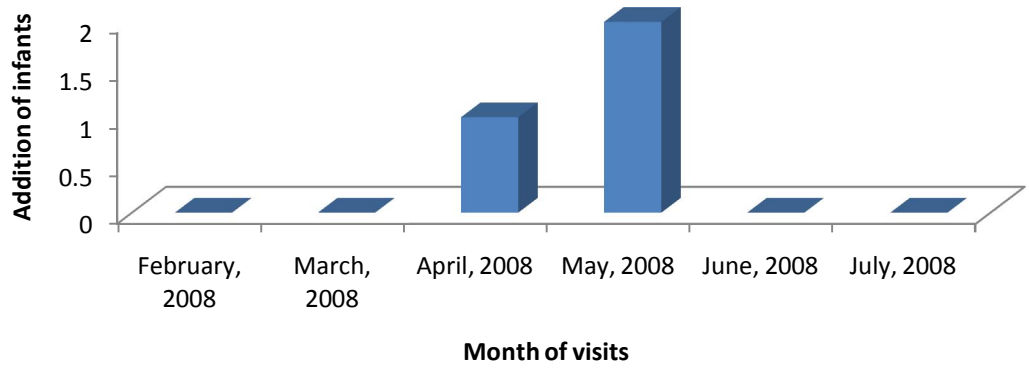
age of male is 4 to 7 years while in female reproductive age is 2 to 4 years, breeding season in all years, females are produce only one baby in good condition and gestation period among female rhesus monkey is 133-200 days (average gestation period is 165 days). He also observed that female give to born 464g baby (average mass) and the infant take 12 months for weaning time.

In present study, it was observed that rhesus macaques show reproductive activity when female attain average age of 3 years and male attain average age of 5 years. It is also observed that female spent more time with male and starts activity likes, proximity, reciprocal grooming, copulation, restlessness and excitement. Three types of reproductive activity i.e., present (standing on all fours exposing hind quarter and tail bending side ways; may be appropriate or in appropriate), mount (hand on others hips, ankle clasp and may be appropriate or in appropriate) and thrust (piston like pelvis movement with genital alignment may be inappropriate) performed by rhesus monkey was observed (photo 1).

During periodic visits, breeding among rhesus macaques occurred in all the year and female give to born new infants with an average mass 480 g. These infants seen in mostly in the month of February to next month of the year. During the present study, it was observed that number of infants varied from 4 (February, 2008) to 8 (July, 2008) in troop-I, from 7 (February, 2008) to 11 (July, 2008) in troop-II and from 6 (February, 2008) to 9 (July, 2008) in troop-III (table 1). It was also observed that addition of infants maximum 2 (May, 2008) in troop-I, 2 (June, 2008) of troop-II and 2 in (May, 2008) of troop-III (fig. 2).

Table: Number of infants in selected troops of Bir Sonty Reserve Forest (BSRF).

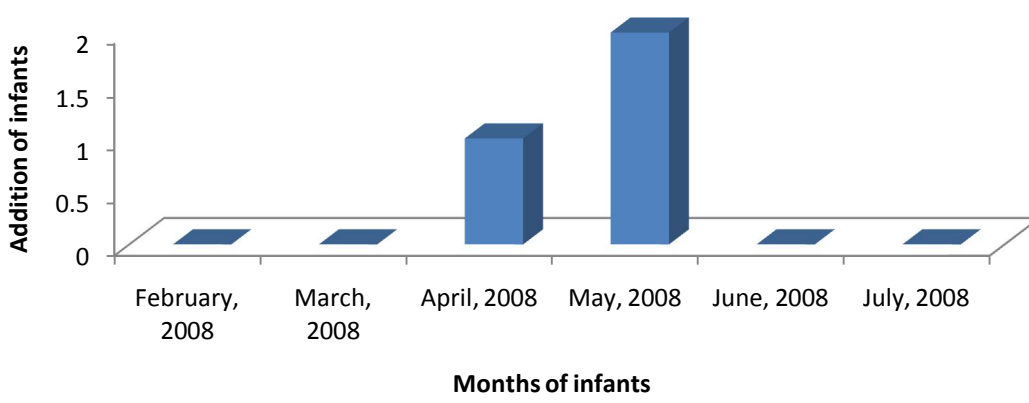
Month of visits	No. of visits	Number of infants		
		T-I	T-II	T-III
February, 2008	1	4	7	6
	2	4	7	6
March, 2008	1	4	7	6
	2	4	8	6
April, 2008	1	5	8	7
	2	6	9	7
May, 2008	1	8	9	8
	2	8	9	9
June, 2008	1	8	10	9
	2	8	11	9
July, 2008	1	8	11	9
	2	8	11	9



(a)



(b)



(c)

Fig. 2 Addition of infants in selected troops of rhesus monkey, *Macaca mulatta*, (a) for troop-I, (b) for troop-II and (c) for troop-III.



Photo 1. Thrust reproductive behavioral activity in rhesus macaques.

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References:

1. Barwer M. Daily activity pattern study of rhesus monkey. *Animal behaviour*, 1971; 72(4):165-169.
2. Bercovitch FB. Reproductive strategies of rhesus macaques. *Primates*, 1999; 38(3):247-263.
3. Berrard J. A four year study of the association between male dominance rank, residing status and reproductive activities in rhesus macaques, *Macaca mulatta*. *Primates*, 1999; 40(1):159-175.
4. Catchpole HR and Van Wagenen G. Reproduction in the rhesus monkey, *Macaca mulatta*. *Int. J. Primatol*, 1975; 2:117-140.
5. Chapais B. why do adult male and female rhesus monkey affiliate during the birth season? In: Rawlins R.G., Kessalar, M.J., editors. *The Cayo Santiago Macaques: history, behaviour and biology*. Albany (NY): State University New York, 1986: 173-200.
6. Dagar JC, Singh G, Singh NT. Evaluation of forest and fruit tree used for rehabilitation of semiarid alkali-sodic soil. *India Journal of Arid land Research and Management*, 2001; 15(2):115-133.
7. Ferris SD, Sage RD, Page EM. Classification of living macaques in D.G. Lindburg, education the *Macaca mulatta* studies in ecology, behaviour and evolution. Van- restern-reinhold, Newyork, 1980; 12(3):1-9.
8. Fooden A. A successful mass translocation on commensal rhesus macaques (*Macaca mulatta*) in Varindaban, India. 2000; 36(1):87-93.
9. Groves RW. How a developing brains gets itself properly wired for adaptive function. In E. to back, L.R. Aronsone and E. Shaw (Eds.). *The biopsychology of development*. New York: Academic Press, 2001; 6(4):42-43.
10. Guerra RF. Maternal transport and locomotor development in infant rhesus monkey (*Macaca mulatta*). *Rev. Bras. Biol.*, 1988; 48(2):227-236.
11. Hunger MD. Spontaneous number representation in semi free rhesus monkey. *Macaca mulatta*. *Proceed in royal society of London*, 2004; 8(2):267,829-833.
12. Lindburg DG. The rhesus monkey in north India: an ecological and behavioral study; in primate behavior, L.A. Rosenblum (ed.) New York, Academic press, 1971; 2:1-106.

13. Loy J. Behavior responses of free ranging rhesus monkey to food storage. *Amer. J. Phys. Anthropol*, 1970; 33:263-272.
14. Marc D and Hauser R. Rhesus monkey copulation calls: honest signal for female choice, *Processing. Biological science*, 2004; 254(1340):93-96.
15. Phelps SM, Rand AS and Rayn MJ. A cogomitive frame work for mate choice and species recognition. *American Naturalist*, 2006;167:28-42.
16. Rawlins RG and Kessler MJ. Reproductive behavior of rhesus monkey. *Cyno Santiago macaques*.Albony, Stat university New York, 1986:13-45.
17. Seth PK, Redu Y and Pokwal NK. Behaviour and ecology of primates. *J. nat. His. Soci.*, 2001; 14(3):172-180.
18. Smith and Mc Donough. Habitat, resources, utilization, pattern and determinates of behaviour in rhesus monkey (*Macaca mulatta*). *J. Hum. Eco.*, 2005;11(1):1-21.

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