CHAPTER 2

PRESENT STUDY

Rationale of the study

The literature review threw lights on the previous work on the PI pattern and provides us the strong rationale for the present study. There are many studies on maternal PI which remained controversial. However, except for a study by Singh et al. (2007) on lion-tailed macaque (*Macaca silenus*), most of them were restricted to either primary sex ratio or quality of milk fed. Moreover, the data on the present study species on the PI patterns were almost negligible. Female primates continue to invest a considerable amount of time and energy in their infant even after birth. Hence, the study of the paternal investment after birth can provide a good insight on the topic. In the present study, the investigator explores the patterns of PI in species that is a strictly seasonal breeder, which differs considerably from lion-tailed macaque, which is a non-seasonal breeder.

Bonnet macaques also mostly live in multi-male groups, where subadults and adult males are equally sexually active (Brown, 2008) and hence male–male relations are well studied in this species. However, paternal investment in macaques only has hardly been studied, and such data on the study species is almost absent. In fact, previous studies (Simonds, 1965, 1974; Sugiyama, 1971) reported the absence of any male care in bonnets. Here, I also propose to include the study of male PI patterns in this species. The present study, therefore, has been designed with the following title: PARENTAL INVESTMENT PATTERNS IN RELATION TO DOMINANCE STATUS IN BONNET MACAQUE (*Macaca radiata*)
PI patterns in relation to dominance status in bonnet macaque (*Macaca radiata*)

**Objectives**

The main objectives of the study are

- Study of maternal PI pattern in relation to dominance rank and sex of offspring.
- Study of male PI pattern in relation to the dominance status of the mother and the sex of the offspring.

In order to study the PI patterns, the data was collected on the following behavioral parameters.

1. To study maternal PI pattern in relation to dominance rank and sex of the offspring.
   a. What is the dominance status of the female in the group?
   b. What is the sex of the offspring born?
   c. What is the suckling frequency and duration?
   d. What is the frequency and duration of weaning behaviors including rejection and punishment?
   e. What is the frequency and duration sociopositive (togetherness; groom; play; retrieve) and socionegative (agonistic) behaviors?
   f. What is the inter-birth interval?

2. To study male PI pattern in relation to the dominance status of the mother and the sex of the offspring.
   a. What is the duration of togetherness with infant?
   b. What is the duration of grooming the infants?
   c. What is the duration of play with infant?
   d. What is the frequency and duration of agonistic behavior towards infant?
Since male and female differ a lot on the investment patterns and females investment is generally high because she invests in infants at the cost of her somatic maintenance. I expected females to differ on their investment patterns in response to their conditions (rank of females), whereas males were expected to differ according to ranks of the mother and sex of the infants. Based on these expectations, I framed following hypothesis for the study of PI patterns in bonnet macaques:

**Hypothesis 1**: Dominant females should produce sons.

**Hypothesis 2**: Subordinate females should produce daughters.

If this doesn’t happen, then the adjustment should be made through after birth investment.

**Hypothesis 3**: A dominant female will make more PI on her male offspring.

**Hypothesis 4**: A subordinate female will make unbiased investment on her male or female offspring.

or

A subordinate female with a male offspring continues PI for a longer period and foregoes the next breeding season.

**Hypothesis 5**: Sub-adults/adult males will make more investment on the offspring of dominant females.

**HOW WOULD THE DATA ANSWER THE MAIN QUESTIONS....?**

- Nipple contact and IBI will indicate direct investment.
- Grooming, proximity,etc will indicate indirect investment.
- Weaning will be considered as the end of direct investment.
- All these will be analyzed in relation to dominance rank and offspring sex.