

# Patterns of Behaviour of Sub-Adult Female Rhesus Monkey (*Macaca mulatta*) in Yangon Zoological Garden, Myanmar

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**Abstract:-** Patterns of behaviour of sub-adult female rhesus monkey *Macaca mulatta* in Yangon Zoological Garden were investigated during July, 2016 to January, 2017. The patterns of behaviour of adult and sub-adult female rhesus monkey were recorded using scan sampling method. Each behaviour of sub-adult female of rhesus monkey consisted of, feeding (12.48%), grooming (24.52%), locomotion (29.01%), resting (25.01%), playing (4.86%) and aggressive (4.12%) respectively. The frequencies of locomotion behaviour were higher than the other behaviours in sub-adult female.

**Keywords:-** Sub-Adult Female; Rhesus Monkey; Behavioural Patterns.

## I. INTRODUCTION

Rhesus macaques (*Macaca mulatta*) live in social groups composed of a few adult males and many adult females and their offspring. The macaques live in multimale and multifemale groups [5].

Among all habitat types, feeding and resting are the major activities of the rhesus macaque's day and they spend the rest of their time travelling, grooming, playing, and other activities [10].

Most macaques are diurnal. Although they are comfortable in trees, they close to spend their time on the ground. Many macaques hang out in large troops that sleep together in the same tree, forage for food in the morning and evening and rest in the afternoon [3].

Zoological survey of India estimated the total rhesus population to be 183000 in 1979. Rhesus macaques were once seriously threatened by the rate of capture and export for people in biomedical research [4].

The species *Macaca mulatta* are popular Zoo animals because of their innate curiosity and active life style [12]. However, in research was ever been done on behaviour of the macaque in Yangon Zoological Garden. The objectives of this study were:

- to examine activities and fundamental behaviour patterns in sub-adult female rhesus monkeys
- to study the duration it spends on each behaviour pattern

## II. MATERIALS AND METHODS

Yangon Zoological Garden, the study area, is located at Longitude 95° 09' 34.01" East and Latitude 16° 47' 34.90" North. It is situated in Mingalataungnyunt Township, Yangon City. The Monkey Village of Yangon Zoological Garden is chosen as our research site. The present study was conducted during the period from July, 2016 to January, 2017. The identification of the macaque was made after [13][1][2]. Data were collected twice a month in the Monkey Village. Observation on frequency and duration of each behavior was conducted using ten minutes scan sampling at five minutes intervals from 7:00am to 5:00pm on adult and sub-adult females. Behaviours of macaques were observed and recorded with the aid of a field binocular and a digital camera. The recordings of the frequency and duration of each behaviour were made. A specific cataloguing was followed to record the following activities are feeding, grooming, resting, locomotion, playing and aggressive behaviour.

## III. RESULTS

The rhesus populations of 41 monkeys were recorded in Yangon Zoological Garden. The age group composition was recorded as 13 adult females (31.71%), four sub-adult females (9.75%), eleven juvenile (26.83%) and 13 infants (31.71%).

### A. Behavioural patterns of sub-adult female *Macaca mulatta*

Based on the half year data in sub-adult female, feeding comprised (12.48%), grooming (24.52%), locomotion (29.01%), resting (25.02%), playing (4.85%) and aggressive (4.12%) of total behavior activities (Fig 1).

In this study, total frequency of feeding behaviour was 203, grooming behaviour was 399, locomotion behaviour was 472, resting behaviour was 407, playing behaviour was 79 and aggressive behaviour was 67 (Table 1). Among the six categories of behavior recorded, the highest frequency was found in locomotion followed by resting behaviour. Grooming behaviour was observed at moderated frequency in this study. Aggressive behaviour was the least frequent (Fig 1).

Overall data revealed that the feeding frequency was highest (40) in January, 2017, and lowest (20) in December. Highest frequency of grooming (63) was found in October and December and the lowest (43) in July. Highest number of locomotion frequency (82) was found in July and the lowest (53) in August. The highest frequency of resting behaviour (72) was found in August and the lowest (46) in October. The highest frequency of playing behaviour (18) was found in January, 2017 but in other months playing occurred at nearly the same frequency in sub-adult females. The highest frequency of aggressive behaviour (12) was found in September and December (Table 1 and Fig 2).

It was observed that the different daytime activity patterns did not occur consistently. Some activities fluctuated with period of the day. Hence, the highest feeding frequency was at (57) and (53) mainly observed in the afternoon. The highest grooming frequency (114) was found

after 3:00 pm (afternoon) of the day. Locomotion behaviour was highest in frequency (131) from 7:00 am - 9:00 am in the morning. The highest frequency of resting behaviour was found at 128 mainly observed after 3:00pm. The nearly the same frequencies of playing behaviour (20, 21 and 23) were found spread out during 9:00am - 5:00pm. Aggressive behaviour had highest frequency (24) in afternoon from 1:00am -3:00pm (Table 2 and Fig 3).

In this study, total duration of feeding behaviour (490 min), grooming behaviour (936 min), locomotion behaviour (1583 min), resting behaviour (1037 min), playing behaviour (280 min) and aggressive behaviour (154 min) were observed in sub-adult female. Among the six categories of behaviour recorded the highest duration was found in locomotion followed by resting behaviour. Aggressive behaviour was the least duration in sub-adult female (Table 3).

Month	Behavioural frequency					
	Feeding	Grooming	Locomotion	Resting	Playing	Aggressive
July	26	43	82	57	8	7
August	33	52	53	72	9	8
September	28	55	69	62	9	12
October	29	63	71	46	10	10
November	27	57	68	62	13	9
December	20	63	57	52	12	12
January	40	66	72	56	18	9
Total	203	399	472	407	79	67
Mean	29.00	57.00	67.43	58.14	11.29	9.57
±SD	6.22	7.94	9.71	8.30	3.45	1.90

Table 1:- Monthly behaviour frequencies of sub-adult female *Macaca mulatta* at Yangon Zoological Garden

Time	Behaviour					
	Feeding	Grooming	Locomotion	Resting	Playing	Aggressive
7:00am-9:00am	42	88	131	79	15	10
9:00am-11:00am	51	89	119	80	20	18
1:00pm-3:00pm	57	108	94	120	21	24
3:00pm-5:00pm	53	114	128	128	23	15
Total	203	399	472	407	79	67

Table 2:- Daily frequencies of the six categories behaviour in sub-adult female *Macaca mulatta* at Yangon Zoological Garden

Month	Behavioural Duration (min)					
	Feeding	Grooming	Locomotion	Resting	Playing	Aggressive
July	68	118	224	192	26	12
August	78	130	194	188	32	18
September	58	138	204	184	36	20
October	66	152	238	122	34	28
November	64	132	257	123	40	24
December	70	138	240	112	50	30
January	86	128	226	116	62	22
Total	490	936	1583	1037	280	154
Mean	70.00	133.71	226.14	148.14	40.00	22.00
±SD	9.31	10.55	21.65	38.53	12.22	6.11

Table 3:- Monthly behaviour Duration (min) of sub-adult female *Macaca mulatta* at Yangon Zoological Garden

According to the data, the highest duration of feeding behaviour (86 min) was found in January, 2017 in sub-adult female and the lowest (58) was found in September. The highest duration of grooming behaviour (152 min) was found in October and the lowest duration (118) was found in July. The highest duration of locomotion (257 min) was found in November and the lowest duration was found in

(194 min) in August. The highest duration of resting (192 min) was found in July and the lowest duration (112 min) was found in December. Highest duration of playing (62) was found in January and lowest duration (26min) was found in July. The highest duration of aggressive (30min) was found in December and the lowest duration (12 min) was found in July (Table 3 and Fig 4).

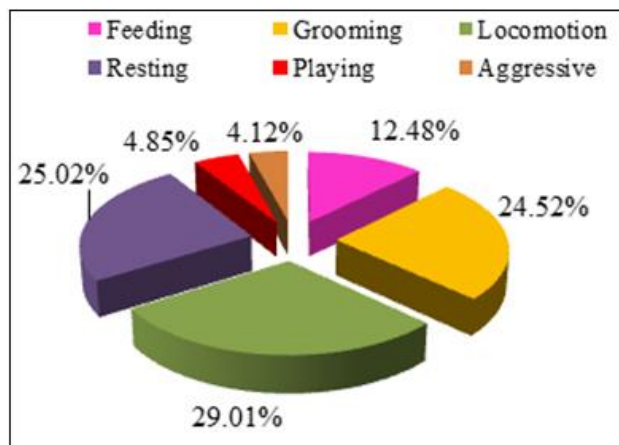


Fig1:- Frequencies (% of total) of six categories in sub-adult female

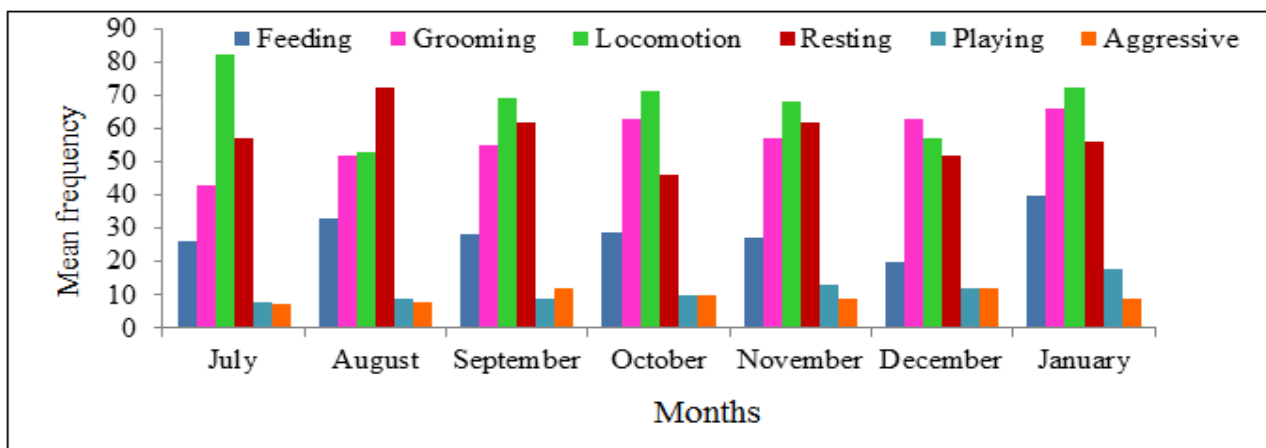


Fig 2:- Comparison on monthly behaviour frequencies in sub-adult female

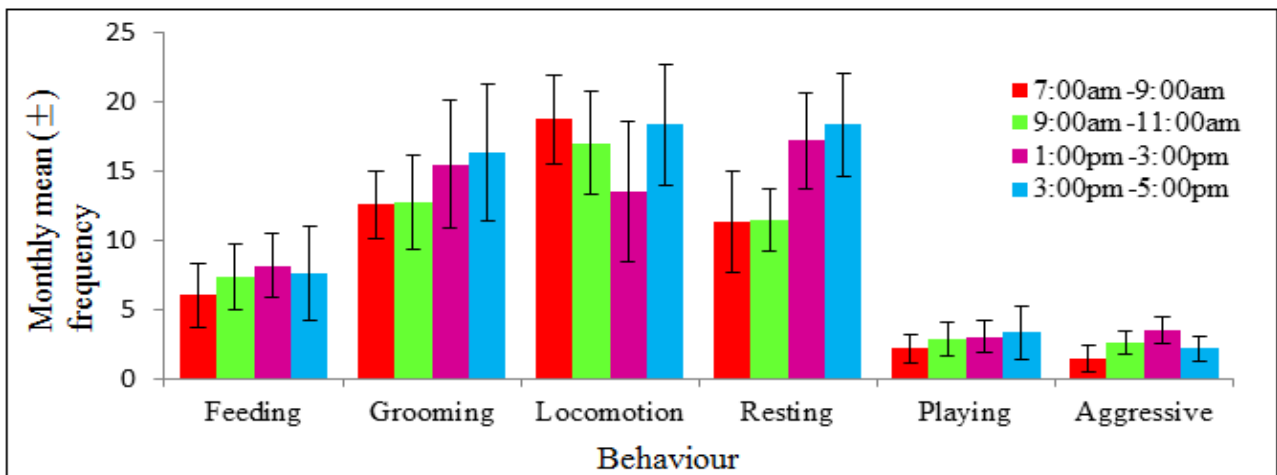


Fig 3:- Comparison of daily frequencies of six behaviour categories in sub-adult female

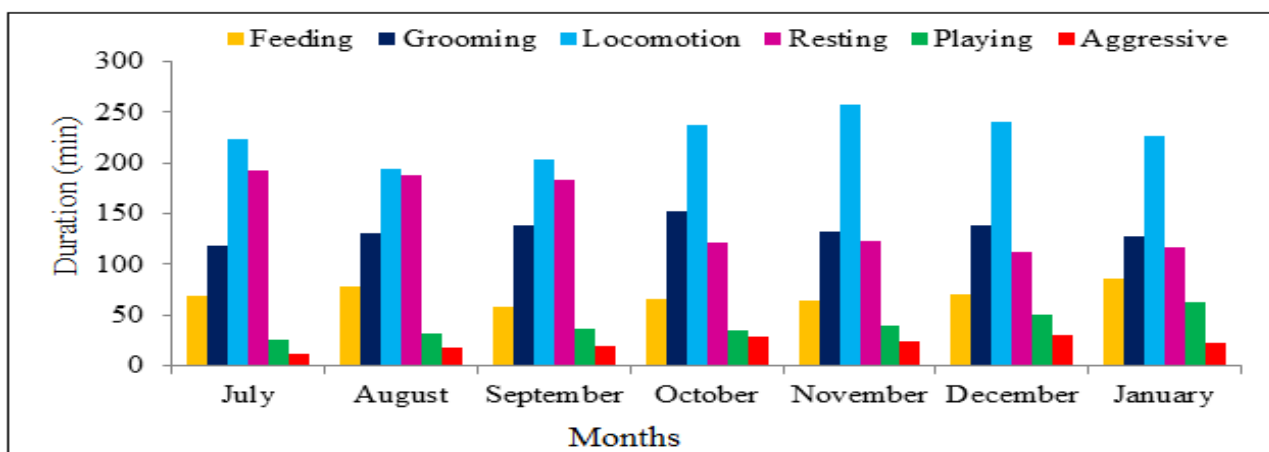


Fig 4:- Comparison of duration (min) of six behaviour categories in sub-adult female

#### IV. DISCUSSION

Patterns of behaviour of sub-adult female rhesus monkeys were conducted in Yangon Zoological Garden from July 2016 to January 2017. In Yangon Zoological Garden, the staff always feed the ration food to rhesus monkeys at every 9:00am and 2:00am of two times per day. And then, rhesus monkeys also receive of artificial food from the people in the form of raw, cooked and fried (eg. banana, beans, maize, bread and noodles). They drank occasionally from drainage ditches.

Time spent for feeding is inversely related to resting [6]. The present study group was observed to have spent less time on feeding because they spent much time on resting. It was also seen that resting period comes after feeding.

Grooming behaviour of adult and sub-adult female was recorded as the third most common activity in the study period. After feeding and while resting, grooming was found frequently.

Mothers were usually found grooming their infant. This is similar to a study of [8] who found mothers continue to groom their offspring until they move out or emigrate from the group.

The rhesus macaques were mainly occupied in arboreal life in nature. In the captive conditions of the study site, they spent most of their time on the ground feeding on food offered by the visitors.

This finding is supported by [9], who reported that the long-tailed macaques are diurnal animals that is active during the day where they use one full day to travel from one area to another in their territory searching for food.

Resting behaviour of the adult female had the highest frequency in this study. This finding was in agreement with other macaques species. Long-tailed macaque and captive Japanese macaques were found to spend the highest proportion of their time resting [7].

In this study, differences occurred in individuals with different sex and age for particular behaviour; sub-adult macaques females show differences in time spent for playing.

This finding is supported by [9], who reported that the daily activity budgets varied across age/sex class in captive long tailed macaque. This is because playing may form

social competition and immature are in active age periods of learning the ways of social relationship.

In this study, aggressive behaviour occurred when monkeys were struggling for food. This finding is similar to report made by [11], who found that aggressive behaviour occurred while gaining food.

## V. CONCLUSION

Patterns of behaviour of sub-adult female rhesus monkey *Macaca mulatta* in Yangon Zoological Garden were investigated during July, 2016 to January, 2017. Primates attract attention of many researchers because they are closely related to human in terms of human social behaviour. Primates are social animals and most of them interact with each other in their species. In addition commensal rhesus macaques show a high degree of behavioural flexibility in response to habitat and resource variability, and knowledge of these differences is important for the conservation and management of highly commensal primate.

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