

# Sighting different behaviours of Western Lowland Gorilla, *Gorilla gorilla gorilla* (Primate: Hominidae) under captive conditions at Sri Chamarajendra Zoological Gardens, Mysuru, Karnataka, India

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**Abstract:** The Western Lowland Gorilla, *G. gorilla gorilla* (Primate: Hominidae) is one of the largest living primates, maintained at Sri Chamarajendra Zoological Gardens, Mysuru (Latitude: 12.3028° N, Longitude: 76.6552° E). It is an exotic species, kept in a well maintained enclosure for public display for creating awareness among the public and for education, conservation and scientific studies. During the present study, after obtaining the permission from the higher authority, Sri Chamarajendra Zoological Gardens, Mysuru, proper planning was made by consulting with Zoological Garden Authority, Range Forest Officer, Animal Caretaker, Education Officer and Biological Scientist to conduct observation so as to record the behaviour of Gorilla. Observations were made two days in a week from morning (10.00 AM), afternoon (01.00PM) and evening (04.00 PM) hours for a period of 56 days i.e., from 4<sup>th</sup> April to 31<sup>st</sup> May, 2025. Observations were made using the focal animal sampling method with each session lasting for a period of 20 minutes by distance outside the enclosure, without creating any disturbance for its activity. Total 17 behaviours were recorded namely: locomotion, drinking, eating, sleeping, resting, vigilance, vocalisation, positive and negative interaction, approach, depart, jumping, hanging, grooming, jumping, chest beating, chasing and sun bathing etc., by following standard methods. All these observations were non-invasive and no interaction or interference with the normal activity of Gorilla in its enclosure. The study was conducted under the awareness of Zoological Gardens Authorities and aligned with the ethical standards for observational studies in Zoological Gardens. Collected data was systematically compiled and analysed using standard methods. Sixteen different behaviors were recorded during morning hours, however, during afternoon and evening hours, all the 17 behaviors shown by *G. g. gorilla*. Analysis of variance of different behaviors of *G. g. gorilla* did indicate significant variation ( $F=6.797$ ;  $P<0.05$ ) under captive conditions. Moreover, different tools/implements are installed inside the enclosure to avoid stereotypic behavior and to have comfortable normal behavior during different periods of the day. Interestingly, there was no abnormal behavior observed during the present study and indicated that the animal is well adjusted to its enclosures and its psychological wellbeing is adequately maintained. This aligns with the hypothesis that enclosures with proper space, enrichment and social opportunities reduce stress related behaviours.

**Keywords:** Western Lowland Gorilla, captive conditions, behaviour, Sri Chamarajendra Zoological Gardens, Mysuru

## I. INTRODUCTION

Under natural conditions, recording the wild animal's behaviour is challenging, and it requires more time, energy and patience. Many wild animal species live with utmost freedom at their natural abode and there is no restrictions on their diverse activities such as feeding, foraging, social interactions, territorial behaviour, avoiding predators/enemies, hunting etc. However, under human captive conditions, such a freedom is not available, despite good efforts are being made time to time, to provide all the possible resources to make use and exhibit normal behaviour by captive animals. Hence, many animal species exhibit significant alterations in their natural behaviour due to restricted space, repetitive conditions and human presence. Despite, good captive environment, many animals face stress that affect feeding behaviour, sleep cycles, social interaction and reproductive success. Many times, such problems are unnoticed unless they are regularly recorded or periodically studied. Understanding different behavioural shifts of wild animals is vital for improving the welfare of animals in Zoological Gardens and to refine conservation practices. Therefore, under human captivity emphasis should

be given to study regularly the captive wild animals to understand their behaviour and to fulfil their requirements in terms of safety, food security, medical care and overall wellbeing of every animal species under captivity.

In most of the Zoological Gardens across the world including in India, wild animals are kept usually in a well maintained enclosure for public display, education, conservation, research and scientific study (WAZA, 2020). It serve as an entertainment centres, but now-a-days, modern Zoological Gardens play a pivotal role in the survival of endangered or threatened or vulnerable species along with least concerned species of exotic or indigenous origin. Zoological Gardens functions under the guidelines of the Central Zoo Authority (CZA), India, which ensures scientific management of wild animal species for their better survival. Thus, Zoological Gardens have evolved into conservation hubs in the name of ex-situ conservation. Here, orphan species rehabilitation including, sick/threatened wild animals treatment, rescue centres for trafficked or injured animals (Reade and Waram, 1996; Hosey, 2008 and 2013) along with public awareness programs (IUCN, 2014) are conducted in the name of conservation. This kind of activities are help contribute biological research and environmental education in a greater way. So, various researchers have conducted observations on different species of wild animals. Mason *et al.* (2007) have observed the stereotypic behaviours in captive zoo animals. Enrichment and appropriate social grouping are essential in reducing the stress in captive animals (Carlstead and Shepherdson, 2000). Young (2003) has emphasized the need of enrichment inside the enclosure, which is crucial to prevent behavioural abnormalities and ensure captive animals' mental stimulation. In this regard, many researchers (Meder, 1985, 1989 & 1990a&b; Ogden *et al.*, 1990 & 1993; Akers and Schildkraut, 1985; Goerke *et al.*, 1987; Gold, 1992; Gold and Maple, 1994; Hoff *et al.*, 1996 & 1997; Rooney and Sleeman, 1998; Nakamichi, 1998; Lukas, 1999; Burks *et al.*, 2001; Stoinski *et al.*, 2001a &b; Stoinski *et al.*, 2002; Stoinski *et al.*, 2004a &b; Wells, 2005; Kuhar *et al.*, 2006; Wells *et al.*, 2006; Carlstead, 2009; Carrasco *et al.*, 2009; Chelluri *et al.*, 2013; Robbins and Margulis, 2014; Vonk *et al.*, 2014; Kurtycz and Ross, 2015; Pedersen *et al.*, 2019 and Leroy *et al.*, 2024) have researched on various aspects of Gorillas at different parts of the world (Table 1). Stoinski *et al.* (2004a&b) have documented the altered group behaviour and withdrawal or aggression during peak visitor hours in Gorillas. Shepherdson *et al.* (2006) have observed the simple foraging enrichment (e.g. Bags, branches) inside the enclosure have increased the activity and reduced boredom in Gorillas. Captive animals show stress-related behaviours when they are exposed to dense or noisy crowds and often display increased vigilance (Davey, 2007). Carrasco *et al.* (2023) have reported the play therapy and positive reinforcement to reduce stereotypic behaviours and to increase social behaviours in Western Lowland Gorillas. However, above mentioned published reports clearly suggested that in Indian Zoological Gardens, research on captive animals (Pratyusha *et al.*, 2026; Nayana *et al.*, 2026) including Gorilla is diffused. Although, India possess good number of Zoological Gardens, established and managed in the name of ex-situ conservation of many wild animal species including Gorilla. Surprisingly, published reports on the behaviour and status of Gorilla in the Zoological Gardens of India are sparse and fragmentary. Sri Chamarajendra Zoological Gardens in Mysore is one of the major Zoological Gardens in India, it is housed with good number of different exotic and indigenous species. The Zoological Garden is maintained well with utmost care, but published reports on captive animals like Gorilla behaviour and its management is not available. Hence, there is a necessity to collect scientific data on captive Gorilla and its behaviour as they are kept in cages for public display. Captive animals exhibit different behaviours during different hours of the day (Saito *et al.*, 2011a&b; Racevska *et al.*, 2018; Albuquerque *et al.*, 2020; Carrasco *et al.*, 2023). Such behaviours should be properly collected using standard methods and collected information can be used for healthy maintenance of captive animals. Interestingly, IUCN (2020) has classified *G. gorilla* as threatened species and emphasized the need ex-situ conservation through proper captive management. And, opportunities to record the behaviours of Gorilla in a captive conditions is poor. Because, it is very difficult to get such an opportunity, however, we were fortunate enough to obtain permission to do such a task during the present investigation. Observations of such investigations are presented in this communication.

## II. MATERIALS AND METHODS

**Study area:** Present investigation was conducted at Sri Chamarajendra Zoological Gardens, Mysuru (Latitude: 12.3028° N, Longitude: 76.6552° E). It is commonly known as 'Mysuru Zoo' in Karnataka, India (Kamath, 2001). It is established in 1892 by Sri Chamarajendra Wadiyar X. Hence, it is one of India's oldest and most well managed Zoological Gardens and spread over 157 acres amidst Mysuru city. The Sri Chamarajendra Zoological Gardens is housed with more than 150 species of mammals, reptiles and birds, and is recognized for its naturalistic enclosures, scientific wild animals care and conservation breeding programs.

**Methodology:** During the present investigation, non-human primate, Western Lowland Gorilla, (*Gorilla gorilla gorilla*) (Primate: Hominidae) was selected after obtaining the permission from the higher authority, Sri Chamarajendra Zoological Gardens, Mysuru vide Official Order No. MZA/Edu-internship/084/2024-2025, dated 28.03.2025. Gorilla was periodically observed by distance for its daily behavioural patterns in its respective enclosure without creating any disturbance for its activity. Proper planning was made by consulting with Zoological Garden Authority, Range Forest

Officer, Animal Caretaker, Education Officer and Biological Scientist to conduct observation so as to record the behaviour of Gorilla. Observations were made two days in a week from morning (10.00 AM), afternoon (01.00PM) and evening (04.00 PM) hours for a period of 56 days i.e., from 4<sup>th</sup> April to 31<sup>st</sup> May, 2025. Observations were made using the focal animal sampling method with each session lasting for a period of 20 minutes. A standardized ethogram was used to classify the observed behaviours as follows. Locomotion (e.g. Walking, climbing, jumping), feeding and drinking, resting (e.g. Sitting or lying inactive), sleeping, vigilance (e.g. Alert posture, scanning surroundings), vocalization, positive social interaction (e.g. Grooming, playing) and negative interaction or aggression (e.g. Threats, chasing, hitting). Informal interview was conducted with animal caretakers and Zoological Gardens staff to gather additional information like feeding schedules, enrichment practices, animal responses to public interaction, medical history or known behavioural concerns to use this information to interpret the behavioural observations. Moreover, a digital stopwatch was used to record each behaviour and data was recorded manually in a field notebook. Observations were made from a distance sufficient to avoid influencing the animal behaviour, typically from designated visitor viewpoints or behind enclosure barriers. The questionnaire was prepared by including 17 parameters, they are: animal name, no. of individuals in the cage, age, diet, stratum, weight, habitat, type of enclosure, area of the enclosure, activity of the animal, time and date of observation, no. of visitors in front of animal cage, weather condition (e.g. Temperature, RH), opinion of visitors about the activity of the animal in the cage/enclosure, name of visitor, age of visitor, native place of visitor, purpose of visit, opinion of the animal caretaker, name of animal caretaker, relationship with captive animal, feeding habits of captive animal, medical history of captive animal were recorded in the questionnaire. Further, behaviour of the Gorilla includes: locomotion, sleeping, resting, abnormal behaviour if any, approach, depart, hanging, grooming, scratching, chest beating, chasing and sun bathing were critically observed and recorded periodically by following standard methods. All these observations were non-invasive and no interaction or interference with the Gorilla. The study was conducted under the awareness of Zoological Gardens Authorities and aligned with the ethical standards for observational studies in Zoological Gardens. Collected data was systematically compiled and analysed using standard methods as per Saha (2009).

### III. RESULTS

Table 2 shows the different behaviors of Western Lowland Gorilla, *G. g. gorilla* during morning, afternoon and evening periods of the day under human captive conditions. Total 17 different behaviors (Plates 1 to 4) were recorded, of which 16 behaviors (except sleeping) were recorded during morning hours. However, during afternoon and evening hours, all the 17 behaviors shown by *G. g. gorilla* (Table 2; Plates 1 to 4) and most of the recorded behavioural observations revealed clear patterns of activity throughout the day. The locomotion (Plate 2 A) was highest during morning (14.5%) and it was followed by afternoon (13%) and evening (11.4%). Drinking activity (Plate 2B) was most frequent during morning (3.8%) and it is decreased during afternoon (1.9%) and slightly increased during evening (2.5%). The eating activity (Plate 3B&D) was high during morning (13.6%) and gradually decreased during afternoon and evening respectively 9.3 and 9.5% (Table 2; Plate 3B&D). Taking rest (Plate 1D and Plate 3C) during morning was less (3%), but it is gradually increased in afternoon (11.7%), and moderate in the evening (6.3%). There was no sleeping during morning, but sleeping behaviour was observed during afternoon (4.3%) and it was very less during evening (0.6%). The vigilance (Plate 4B) was high during morning (6%) and decreased gradually in afternoon (4.3%) and little less during evening (5.7%). The vocalization (Plate 4C) showed a steady increase in morning (3.8%), and decreased slightly during afternoon (3.1%) and increased further during evening (7.6%) (Table 2). The positive interaction with care take (Plate 4A) was moderate during morning (6%), high during afternoon (8.6) and less during evening (5.7%). Similarly, the negative interaction (Plate 1B; Plate 2C; Plate 3A and Plate 4E) during morning was 8.9% and during evening only 3.2%. Moreover, departing and approaching behaviours varied considerably. The departing behaviour was high during evening (8.9%) and approaching behaviour was relatively consistent during morning (8.5%) and evening (8.2%) hours but, it was less during afternoon (6.7%). Further, jumping activity was high during evening (8.9%), but it was moderate during morning (6.8%) and very less (3%) during afternoon. The chest beating behaviour (Plate 4D) was high during morning (8.5%) and decreased (4.9%) during afternoon and slightly increased (5.7%) in the evening. However, the scratching behaviour was consistent from morning to evening and it was ranged in between 6.0 to 7.4%. The yawning was low during morning (2.1%), but highest (8.6%) during afternoon (8.6%) and decreased to 5% during evening. The defecation (Plate 1A) was gradually increased from morning to evening and it was 0.4, 1.8 and 3.8% respectively during morning, afternoon and evening hours of the day (Table 2). Moreover, other behaviors such as playing (Plate 1C), walking (Plate 2A) and showing dominance (Plate 2D), growling at visitors (Plate 4C) were recorded during the present study. Analysis of variance of different behaviors of *G. g. gorilla* did indicate significant variation ( $F=6.797$ ;  $P<0.05$ ) under captive conditions. This clearly indicated that *G. g. gorilla* showed similar type of behavior during most of the period except few changes in a day (Table 2). Figure 1 shows the per cent occurrence of different behaviors of *G. g. gorilla* during different periods of the day under captive conditions in Sri Chamarajendra Zoological Gardens, Mysuru. Plates 1 to 4 shows the different behaviors exhibited by the *G. g. gorilla* during the present investigation at Sri Chamarajendra Zoological

Gardens, Mysuru. Plate 4 shows the tools/implements installed inside the *G. g. gorilla* enclosure at Sri Chamarajendra Zoological Gardens, Mysuru.

#### IV. DISCUSSION

The Western Lowland Gorilla, *G. g. gorilla* (Primate: Hominidae) is the smallest of the *Gorilla* subspecies, but it remains the largest living primates. It is native to the dense tropical rainforests and swampy forests of Central and West Africa, particularly in Cameroon, Gabon, Republic of the Congo and Equatorial Guinea. *G. g. gorilla* is a diurnal animal, primarily terrestrial and moving on all four limbs using knuckle-walking (Plate 2A). Socially, it live in cohesive troops under natural conditions and each troop is led by a dominant silverback male. Each troop includes several females and their offspring. *G. g. gorilla* communication includes grunts (Plate 4C), chest beating (Plate 4D), facial expressions and different body postures (Plates 1 to 4). *G. g. gorilla* is herbivore, primarily feeds on leaves (Plate 3D), stems, fruits, roots, bark and occasionally termites or ants. It is a non-territorial, highly intelligent animal and known for its gentle temperament, particularly in stable social settings under captive conditions. Interestingly, *G. g. gorilla* behave differently in the wild. Tool use (e.g. Simple stick manipulation), complex social grooming, resting, foraging throughout the day and protective behaviour from the dominant silverback are commonly occurring behaviours of *G. g. gorilla* in the wild. However, during the present study, many of the behaviours were similar to the natural behaviours of the Gorilla in the wild. *G. g. gorilla* adapt moderately well to the captive conditions in Zoological Gardens. But, it requires complex environment along with low-stress management. Commonly occurring behaviours observed are in captivity in Zoological Gardens. Similar type of observations were reported by Hosey (2005). Moreover, *G. g. gorilla* benefit from visual barriers (to hide from constant visitor gaze), (Plate 2C), behavioural enrichment (e.g. Nesting material, mirror toys, foraging games) (Plates 5) and companionship and social interaction particularly among familiar individuals. However, at Sri Chamarajendra Zoological Gardens, animal caretakers have implemented quiet zones and shaded areas (Plate 1D & C; Plate 3B&C) to reduce stress. Animal caretakers stated that the silverback *G. g. gorilla* exhibits isolation behaviour during peak visitor times, while young Gorillas are more curious and active when enrichment toys are introduced. Therefore, inside the enclosure, more enrichment tools (e.g. Puzzle feeders, climbing structures) have to be installed to reduce abnormal behaviour and increased naturalistic activity (Carlstead and Shepherdson, 2000). At Sri Chamarajendra Zoological Gardens, enclosures of Gorilla is well equipped with sitting, playing and climbing platforms under shaded areas. Zoo garden animal care takers are more alert during most of the day to provide good facility for the normal survival of many captive animals (Pratyusha *et al.*, 2026; Nayana *et al.*, 2026) including the Gorilla under captive conditions. Despite all these installations inside the enclosure, human (visitors) presence in Zoological Gardens have both positive and negative impacts on captive animals (Hosey, 2005, 2008 and 2013). For social species like primates (e.g. Gorilla), visitors could act as a source of novelty or enrichment. Captive primate's show increased activity, becoming more alert, playful or interactive when people are present in moderate numbers. Moreover, many captive animals may develop stress or aggression due to large noisy crowds that cause animals to hide, pace, over groom or avoid feeding (Mallapur *et al.*, 2005). Enrichment items like puzzle feeders improve their stereotypic behaviour (Boinski *et al.*, 1999) and reduced the abnormal behaviour (Brent and Eichberg, 1991). Play therapy and positive reinforcement is significantly reduced the stereotypic behaviours and increased the social behaviours (e.g. Grooming and play) in Western lowland Gorillas (Carrasco *et al.*, 2023). Poor enclosure design and space limitation have contributed to the increased stereotypies in Indian zoo primates (Mallapur *et al.*, 2005). However, during the present study, stereotypic/abnormal behaviour was not recorded due to well-furnished enclosure for normal activities of Gorilla (Plate 5). So, in the present communication, attempts were made to collect scientific information on behavioural rhythms of *G. g. gorilla* during different periods of a day. Moreover, present study reveal the normal activity of Gorilla under controlled human captive conditions.

Thus, *G. g. gorilla* exhibited a clear biphasic activity pattern, with increased physical and social activities during morning and evening periods, and a considerable drop-in activity during afternoon period. Gorilla displayed individual variability, but its favoured rest and minimal movement during the afternoon, with increased social and energetic behaviours like chest beating (Plate 4D) in the evening, possibly as part of display or social reinforcement behaviours. Interestingly, social interactions were more common in the evening with Gorillas suggesting a period of social bonding or conflict resolution before rest. Surprisingly, negative interactions remained low overall, reflecting a relatively stress free captive environment is an indicator of good animal welfare activities in Zoological Gardens. No stereotypic or abnormal behaviours (e.g. Pacing, over grooming and self-injury) were observed during the present study during different periods of the day. This indicated that the animal is well adjusted to its enclosure and its psychological wellbeing is adequately maintained. This aligns with the hypothesis that enclosures with proper space, enrichment and social opportunities reduce stress related behaviours. Since, Gorilla is enlisted in IUCN Red List as 'Critically Endangered' species (IUCN, 2014) due to its habitat destruction (e.g. Deforestation, mining, agriculture etc.), poaching (e.g. Bush meat trade) and disease outbreaks, especially Ebola virus. *G. g. gorilla* population has declined by over 60% in the past 20 to 25 years (IUCN, 2014). Hence, regular observation on Gorilla behaviour under captive conditions are very essential to monitor, manage

and maintain this species. Thus, our observations are in accordance with the observations of Meder (1985, 1989 & 1990), Ogden *et al.* (1990 & 1993), Akers and Schildkraut (1985), Goerke *et al.* (1987), Gold (1992), Gold and Maple (1994), Hoff *et al.* (1996 & 1997), Rooney and Sleeman (1998), Nakamichi (1998), Lukas (1999), Burks *et al.* (2001), Stoinski *et al.* (2001), Stoinski *et al.* (2002), Stoinski *et al.* (2004a & b), Wells (2005), Kuhar *et al.* (2006), Wells *et al.* (2006), Carlstead (2009), Carrasco *et al.* (2009), Chelluri *et al.* (2013), Robbins and Margulis (2014), Vonk *et al.* (2014), Kurtycz and Ross (2015), Pedersen *et al.* (2019), Leroy *et al.* (2024), Pratyusha *et al.* (2026) and Nayana *et al.* (2026).

## V. SUMMARY AND CONCLUSION

During the present study, behavioural pattern of one of the non-human primates, *G. g. gorilla* across different periods of the day at Sri Chamarajendra Zoological Gardens. Behavioural activities were observed in correlation with visitor presence, providing insights into animal welfare and enclosure management. Gorilla showed distinct temporal variations in its behaviour. Gorilla exhibited increased locomotion and interaction during evening period with feeding preferences during morning and rest during afternoon. During evening period, it was active particularly with physical activity like chest-beating and jumping. Differences in scratching, yawning, and defecation frequencies reflected individual variability and environmental responses. Overall, Gorilla exhibited naturalistic behaviours, indicating good welfare conditions at Sri Chamarajendra Zoological Gardens, Mysuru, Karnataka, India.

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Table 1. Published reports on Western Lowland, *Gorilla gorilla gorilla* at different parts of the world

Sl. No.	Researched on	Source
1.	The regurgitation/reingestion and coprophagy in captive Gorillas.	Akers and Schildkraut (1985)
2.	The integration of hand-reared Gorilla infants in a group.	Meder (1985)
3.	Regurgitation and reingestion in captive Gorillas.	Gould and Bres (1986)
4.	The behavioral changes of a juvenile Gorilla after a transfer to a more naturalistic environment.	Goerke <i>et al.</i> (1987)
5.	Effects of hand-rearing on the behavioral development of infant and juvenile <i>G. g. gorilla</i> .	Meder (1989)
6.	Sex differences in the behavior of immature captive Lowland Gorillas.	Meder (1990)
7.	The integration of hand-reared Gorillas into breeding groups.	Meder (1990)
8.	The Gorilla adaptations to naturalistic environments.	Ogden <i>et al.</i> (1990)
9.	Non-social behavior of captive infant Gorillas.	Gold (1992)
10.	Personality and utility of tools management in Gorilla.	Gold and Maple (1994)
11.	The preference for structural environmental features in captive Lowland <i>G.g. gorilla</i> .	Ogden <i>et al.</i> (1993)
12.	The behavioral effects of changing group membership among captive Lowland Gorillas.	Hoff <i>et al.</i> (1996)
13.	Individual and social behaviour of lowland Gorillas in outdoor exhibits compared with indoor holding areas.	Hoff <i>et al.</i> (1997)
14.	The stick throwing by <i>G. g. gorilla</i> at the San Diego Wild Animal Park.	Nakamichi (1998)

15.	Rooney and Sleeman (1998) have recorded the effects of selected behavioural enrichment devices on behavior of Western Lowland <i>G. g. gorilla</i> .	Rooney and Sleeman (1998)
16.	The nutritional and motivational factors contributing to the performance of regurgitation and reingestion in captive lowland <i>G. g. gorilla</i> .	Lukas (1999)
17.	Effects of environmental and social variation and structural preferences of captive western lowland <i>G. g. gorilla</i> at different habitats.	Stoinski <i>et al.</i> (2001a)
18.	The management and socialization of an adult male <i>G. g. gorilla</i> with a history of social deprivation.	Burks <i>et al.</i> (2001)
19.	The preliminary behavioral comparison of two captive all-male Gorilla groups.	Stoinski <i>et al.</i> (2001b)
20.	Effect of structural preferences, temperature and social factors on visibility in Western Lowland, <i>G. g. gorilla</i> .	Stoinski <i>et al.</i> (2002)
21.	The factors which influence the formation and maintenance of all-male Gorilla groups in captivity.	Stoinski <i>et al.</i> (2004a)
22.	Social dynamics of captive Western Lowland Gorillas living in all-male groups.	Stoinski <i>et al.</i> (2004b)
23.	Age, housing and behaviour of Gorilla.	Kuhar <i>et al.</i> (2006)
24.	Effect of auditory stimulation on the behavior and welfare of zoo-housed Gorillas.	Wells <i>et al.</i> (2006)
25.	Comparative approach to the keeper-animal relationships in the Zoo.	Carlstead (2009)
26.	The benefits of training/playing therapy in a group of captive Lowland <i>G. g. gorilla</i> .	Carrasco <i>et al.</i> (2009)
27.	The behaviour and welfare implications of informal interactions between caretakers and zoo-housed Chimpanzees and Gorillas.	Chelluri <i>et al.</i> (2013)
28.	Effects of auditory enrichment on Gorillas.	Robbins and Margulis (2014)
29.	Quantitive estimation and comparison of the Western Lowland <i>G. g. gorilla</i> .	Vonk <i>et al.</i> (2014)
30.	The birth patterns in Western lowland <i>G. g. gorilla</i> and human presence in zoological settings.	Kurtycz and Ross (2015)
31.	The Gorillas and Orangutans interactions and modified behavior in a Zoo setting.	Pedersen <i>et al.</i> (2019)
32.	Visitor impacts on social dynamics and space use in captive Western Lowland, <i>G. g. gorilla</i> in a naturalistic zoo exhibit.	Leroy <i>et al.</i> (2024)

Table 2. Analysis of variance of different behaviours of Western Low Land Gorilla, *Gorilla gorilla gorilla*

Sl. No.	Behaviour	Observation of different behaviour during			Total
		Morning	Afternoon	Evening	
1.	Locomotion	61	35	42	138
2.	Drinking	16	10	8	34
3.	Eating	59	30	30	119
4.	Resting	17	28	26	71
5.	Sleeping	-	15	8	23
6.	Vigilance	26	20	15	61
7.	Vocalization	19	12	13	44
8.	Positive interaction	26	20	30	76
9.	Negative interaction	42	19	21	82
10.	Depart	31	19	13	63
11.	Approach	35	22	26	83
12.	Jumping	30	13	14	57
13.	Chest beat	38	13	24	75
14.	Scratching	26	22	25	72

15.	Yawning	12	22	20	54
16.	Defecate	4	3	6	13
Total		442	303	321	1065
'F' value		6.797*			-

Note: \*Value is significant at 1% level.

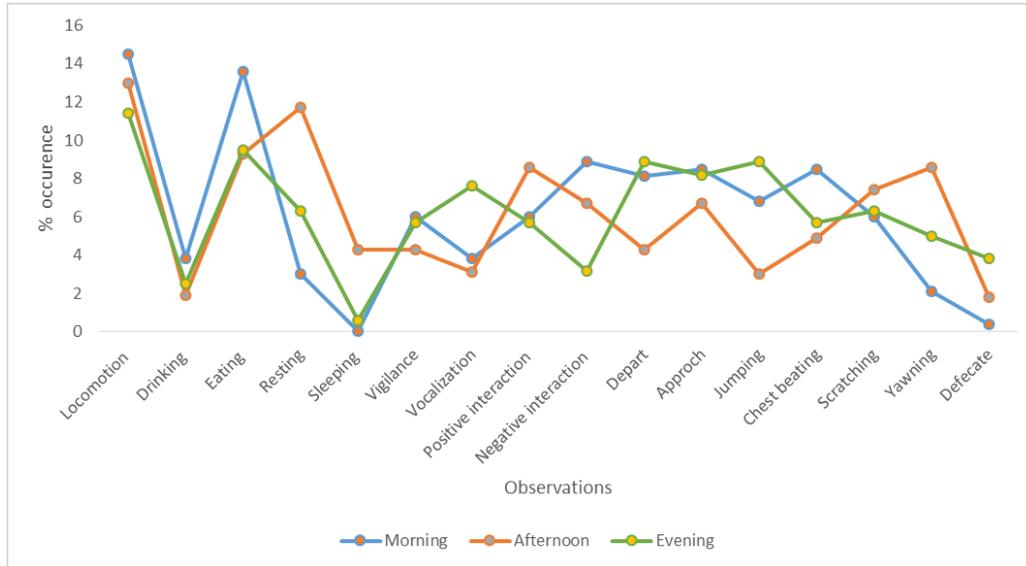


Figure 1. Per cent occurrence of different behaviours of Western Lowland Gorilla, *G. g. gorilla*



A. Defecating



B. Standing on wooden log



C. Playing with swing



D. Resting

Plate 1. Different behaviours of Western Lowland Gorilla, *G. g. gorilla*



A. Walking



B. Sitting in the pond



C. Hiding behind the wild grass



D. Showing Dominance

Plate 2: Different behaviours of Western Lowland Gorilla, *G. g. gorilla*



A. Showing back to the visitors



B. Eating



C. Resting



D. Eating leaves

Plate 3. Different behaviours of Western Lowland Gorilla, *G. g. gorilla*



A. Communicating with care taker



B. Looking at visitors



C. Growling at visitors



D. Chest beating



E. Avoiding the visitors

Plate 4. Different behaviours of Western Lowland Gorilla, *G. g. gorilla*



A. Resting area



B. Climbing structures



C. Water source



D. Visitors viewing area

Plate 5. A view of enclosure of Western Lowland Gorilla, *G. g. gorilla* at Sri Chamarajendra Zoological Gardens, Mysuru, Karnataka, India