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The Behaviour of Indian Wild Ass *(Equus hemionus khur)* in Captivity at Sakkarbaug Zoo Junagadh, Gujarat, India

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Abstract:
Present study was carried out on behavioural activity of Indian Wild Ass (*Equus hemionus khur)* in captivity at Sakkarbaug zoo Junagadh, Gujarat, India. Indian wild ass is critically endangered species fall into schedule-I. Two (male and female) wild ass of 4-5 year old was observed. Two hours observation was taken daily at morning. Standing, walking, grazing, running, facial, fighting, grooming, eating, etc behaviours were recorded. The observations of various behaviour activities of Indian wild ass were recorded from August 2019 to February 2020. Two different types of behaviours like active behaviour and inactive behaviour were observed with male and female in captivity. The time interval method was used. The wild ass's activity was registered in every ten minutes, twelve times in two hours at morning. Sixteen types of behavioural activities were recorded in the captive wild ass. They were displaying different types of activities. Peaceful sharing of food with one another without competition was found in wild ass.

Keywords: Indian wild ass, Behaviour, Captivity, Sakkarbaug Zoo

INTRODUCTION

Indian wild ass (*Equus hemionus khur*) is an odd toed ungulate of the family Equidae that comprises of seven closely related species placed in a single genus Equus (George and Ryder, 1986; Oakenfull et al., 2000). During the last Pleistocene, 40000 years ago, Asian wild asses are known to have roamed as far as, west Germany (Kurten, 1968), like many other large bodied mammals, equids vanished from numerous biogeographic regions during a mass extinction about 12,000 years ago. The Asiatic wild ass *Equus hemionus* is one of the seven world wide equid species: the others were being *E. hemionus*, *E. kiang*, *E. africanus* and zebras: *E. zebra, E. grevyi, E. burchelli* and wild horse *E. ferusprzewalski* (Moehlman, 2002).The range of Asian wild asses has continued to shrink even since. In the 13th century, the presence of numerous herds in Persia, the middle East, Arabia, Turkestan and the Gobi were recorded (Eisenmann 1979).

This endangered species is listed in Near Threatened (NT) (IUCN 1996) because a population decline of at least 20% is projected over the next three generations (Goyal 1999), based on old prevailing and newly emerging risks, thus approaching vulnerable (VU) under a schedule I of India's Wildlife protection act (1972).

The Asiatic wild ass resembles horses most closely (Nowak, 1991). The coat colour ranging from light brown to reddish brown while the ventral surface rumo and muzzle are white (Nowak, 1991). Each foot has a single toe with a solid hoof (Feh, et al. 2002). The species is characterized by a horse like; head and body length range between 200 cm to 220 cm, while shoulder height is between 110 cm to 120 cm with a body weight ranging between 200-260 kg (Blanford, 1888, Feh, et, al 2002). Foals are

born after a long gestation period (11 Months) with birth peak between April-September (Feh, et, al 2002).

Habitat Ecology

The sub-species inhibits arid and saline clay desert in the little rann of kutch (LRK). An exotic shrub; *Prosopis juliflora* was introduced in areas adjoining LRK during 1899-1900 (Prasad 1994). Sub sequential plantation of the shrub was adopted for limiting the spread of the desert (Joshi, 1959). The area inhibited by the animal undergoes annul flooding during the monsoon with the emergence of *cyperus sp.* and *scirpus sp.* (Shah, 1993).

Social Organization and Behaviour

Group size in the wild ass varies widely with fission-fusion occurring throughout the year (Singh, 2000). Groups consist of two primary social units, the family/breeding band consisting of multiple age classes of females, foals, yearlings and few (occasional) sub-adult males and dominant stallion and all-male groups (Shah, 1993). They live in unstable groups except that of female-foal bond (David 1995). Group fusion to form large family groups has been observed during monsoon when good quality food is abundant in the form of fresh grass (Shah, 1993).

Distribution

The sub species *E. h. khur* had a wide distribution range extending from the India in the North-West to Turkey to northern china and Soudi-Arabia with populations also reported from China, Mongolia, Turkmenistan, Kazakhastan, Iran and Pakistan (Moehlman, 2002, Bannikov, 1961). The present distribution is restricted to the little ran of kutch (India) and surrounding areas (corbet and hill, 1992). The Khur presently have expanded their range from beyond LRK to the Rajasthan and Pakistan borders in the north and west and Nalsarovar sanctuary and Bhal areas of Gujarat (Khaire 2017) along with an increase in their population (Shah, 2007). Figure 1 shows the distribution of Indian wild ass in Gujarat.

Figure 1: Distribution of Indian wild ass in Gujarat.
Source: https://en.m.wikipedia.org/wiki/Indian_wild_ass_sanctuary
Retrieved on 14-2-2020

Numbers of Indian wild ass in Captivity at Sakkarbaug Zoo, Junagadh
Seven wild ass were present in captivity at Sakkarbaug Zoo, out of this three were adult Male; Four were adult Female.

Food and Feeding
The Indian wild asses are herbivores, feeding on grasses during monsoon and winter (Gersick 2017). They feed pods, leaves, wood, bark or stems of the plant (Kaczensky 2010). They eat perennial grasses (Moncotyledons) that are of species of *Stipa* or *Agropyrom* (Lengger 2007, Sinha 2006). They also eat herbs, leaves and bark (Glenn, 1999). There were seen food and feeding difference in wild and in captivity in Indian wild ass. In wild they were feed at day (Pratt, et, al 1986). When wild ass in captivity were giving the food in the cage. The food was provided in particular quantity for each wild ass. For Adult the food was given two times per day. Quantity of food for Adult was 16kg for two wild ass (male and female). Quantity of food for Youngones was same as adult. In captivity food is given in morning and evening.

METHODOLOGY

Study area
The study area was the Shakkarbaug zoo, Junagadh. Junagadh city is the head quarter of Junagadh district in the state of Gujarat. The city is located at the foot of the Girnaar Hills and it is 7th largest city in Gujarat. Gujarat provides a wide and diverse range of habitats (Raval, 2011). Sakkarbaug zoo is the oldest zoo of Gujarat and India's third oldest zoo. It is famous for breeding *Panthera liopersica* and supplies it to other zoos. Sprawling over an area of 84 hectares, sakkarbaug zoo was open to the public in 1853. Some of the fauna include wolf, panther, deer, antelope, black buck and spotted deer, tiger, lion, hyena, wild dog, hippopotamus, etc. Purpose of the sakkarbaug zoo is to protect the animals in captivity and also to educate the people about the endangered and rare species of the earth. Library of the zoo helps to increase knowledge and give more information about the animals. (Timing: 9:00 AM to 5:00 PM, Wednesday closed). Figure 2 shows the map of Gujarat. Figure3 shows the map of Junagadh and the location of Sakkarbaug zoo. Figure-4 Shows the entrance gate of Sakkarbaug zoo, Junagadh. (21° 53' 99" N and 70° 46' 73" E).

Figure 2: Map of Gujarat
Source: https://en.m.wikipedia.org/wiki/Junagadh_district
Retrieved on: 26 January 2020

Figure 3: Map of Junagadh city
Source: http://www.neptuneholidays.com/india/city-details/90/junagadh/
Retrieved on: 27 January 2020

Figure 4: Entrance gate of Sakkarbaug Zoo Junagadh

Method

The different type of behavioural activities of wild ass (*Equus hemionus khur*) in captivity was observed at Sakkarbaug Zoo, Junagadh, and The behaviour of Two Indian wild ass (Male and Female) was studied for a period of seven months. Each wild ass was observed for the time duration of two hours, daily. Observations were taken from August 2019 to February 2020. Three seasons were studied monsoon, post monsoon and winter. The ethogram was used to represent the behavioural observations. We used the time interval method to develop an activity budget for the Indian wild ass (Dave 2019). Standard deviation (SD) and mean of the behaviours in each category were calculated in minutes of each behavioural event. Behavioural activities were divided into mainly two different types of groups (1) Active behaviour and (2) Inactive behaviour. In the active behaviour walking, running, standing, fighting, facial, calling, eating, grooming, flehmen, orientation, excretion was included. In the inactive behaviour resting, seating, sleeping was included.

Individual types of Activity

Under some conditions, it is possible to record all occurrences of certain classes of behaviors in all wild Ass during each observation period (Altmann 1974). Feeding**:** which includes grazing, browsing and walking between the feeding bouts. Resting: when the animal stands and when rest in sternal or lateral recumbency. Movement: walks, trots or runs are included. Other activities**:** It included social activities, such as flehmen, courtship behaviour,mounting, vocalization, alio and auto grooming, nursing, foal-play, bitting, micturition, defecation and drinking activities (Khunt 2011).

Social types of Activity

Contact with observer - look for active interaction with observer, approach and manipulation with his clothes and shoes; consolidation reaction - closer relations (Klingel 1977). (Without physical contact and with physical contact - touch by side and climb), rally (mutual rubbing each other by side, licking each other's faces and whining) and joint howling. Friendly activity - approach with head down swaying, mild wagging, touch nose to nose, licking of angle of lips and lower jaw of another individual, smile corresponds to face expression, looking of another individual and scratching (Shahi 1981). Play - activity was registered when any forms of play were observed. Stress reaction - fight, fear, avoidance of a stress factor; usually it was registered on external stimulus.

RESULT AND DISCUSSIONS

The Sixteen behaviour of Indian wild Asses were observed during the study in captivity. Wild ass showing facial behaviour was often used to express emotions, wild ass were peaceful sharing food with one another. The sixteen most common behaviours were observed during time period of August 2019 to February 2020. These behaviours were observed: Standing, Walking, Scratching, Grazing, Active for reproduction, Seating, Running, Eating, Sluggered, Calling, Facial, Urinating, Defecation, Grooming, Flehmen and Fighting. Wild ass mostly shows standing and scratching behaviours.

A significant difference was found in the different type of behaviours. Different kinds of communication were observed between wild Ass. Unwell wild asses were found spending most of their time in standing. In this study, wild asses demonstrated standing and scratching behaviours more frequently as compared to other behaviours. Wild asses showed rarely sluggered and seating behaviours as compared to other. Some large trees, shrubs with bark and leaves, rock piles and many other features can increase the possibility to provide homely atmosphere for wild asses in captivity. Lower aggression and stress level shows strong social bonds with each other in male and female.

We found that when wild ass kept in cage, shows very less activity in female than male. We also found in our study that no competition occurred for feeding in wild Asses. Some types of behaviors, wild ass display in the wild does not occur in the Zoo.

The overall decrease in behaviors can be contributed to several factors, including but not limited to human interactions, feeding habits, captivity. Feeding was the principal activity (53.21%) and resting was second most important activity (32.39%) of Indian wild ass during the whole year (Canjun, 2013). The only long lasting social association is between foal and mother (Klingel, 1972). Khur have long gestation period (11-12 months) (Molhotra, 1989, Asa, 2002) and simultaneous lactation. Seasonal birth period with the peak in August- September

During our study, we observed that, when the wild ass was alone in the captivity, itshows the various types behavioural patterns. It was continuously under stress and it was continuously seeing other wild ass which is kept in other cage. It was unremittingly standing in its cage. It was found in more stress. In that case, other activities like walking were found less frequently. It tries to smell the person if anyone goes near to the cage. Standing, scratching, facial behaviours were seen in captivity when it was alone. When the male wild ass was kept with female it showed different behavioural activities. The time Asiatic wild ass spent, standing was the highest in monsoon (47.84%) and lowest in winter (43.58%), while seating was highest in monsoon (0.34) and lowest in winter (0.22).

Table 1 shows the various types of behavioural data of Indian wild ass for Seven months.

Table 1: Numbers of Behavioural Activity of Indian Wild Ass in Different Months (Male)

Behaviours	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Standing	488	352	356	392	433	480	479
Walking	333	206	203	270	309	31	270
Scratching	441	272	271	250	301	183	343
Grazing	180	119	125	153	182	134	195
Active	19	11	24	23	40	33	23
Seating	6	0	0	0	2	5	0
Running	9	5	8	20	25	50	15
Eating	8	4	60	68	101	124	54
Sluggerd	10	4	2	0	5	3	2
Calling	16	13	23	8	27	30	16
Facial	270	162	194	154	176	156	231
Urinating	28	19	18	22	25	20	22
Defecation	21	8	4	7	11	10	8
Grooming	6	11	10	14	28	9	15
Flehmen	13	10	30	19	22	28	18
Fighting	0	1	7	5	22	5	12

Table 2 shows the various types of behavioural data of Indian wild ass for Seven months.

Table 2: Numbers of Behavioural Activity of Indian Wild Ass in Different Months (Female)

Behaviours	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Standing	452	319	356	370	397	441	471
Walking	253	152	201	212	232	241	264
Scratching	295	110	102	101	174	183	118
Grazing	204	149	138	174	170	210	147
Active	0	0	0	0	0	23	0
Seating	4	1	3	0	0	23	1
Running	4	5	7	14	28	37	40
Eating	8	4	57	77	96	50	122
Sluggerd	7	3	5	0	0	2	1
Calling	3	5	5	5	27	14	30
Facial	285	156	133	168	181	194	112
Urinating	23	19	12	13	17	18	16
Defecation	9	7	7	10	10	8	14
Grooming	7	11	10	14	29	15	7
Flehmen	2	5	11	3	11	9	20
Fighting	0	1	6	5	22	12	5

Figure 5 shows Male the Mean and SD duration of behavioural activities of wild ass in seven months.

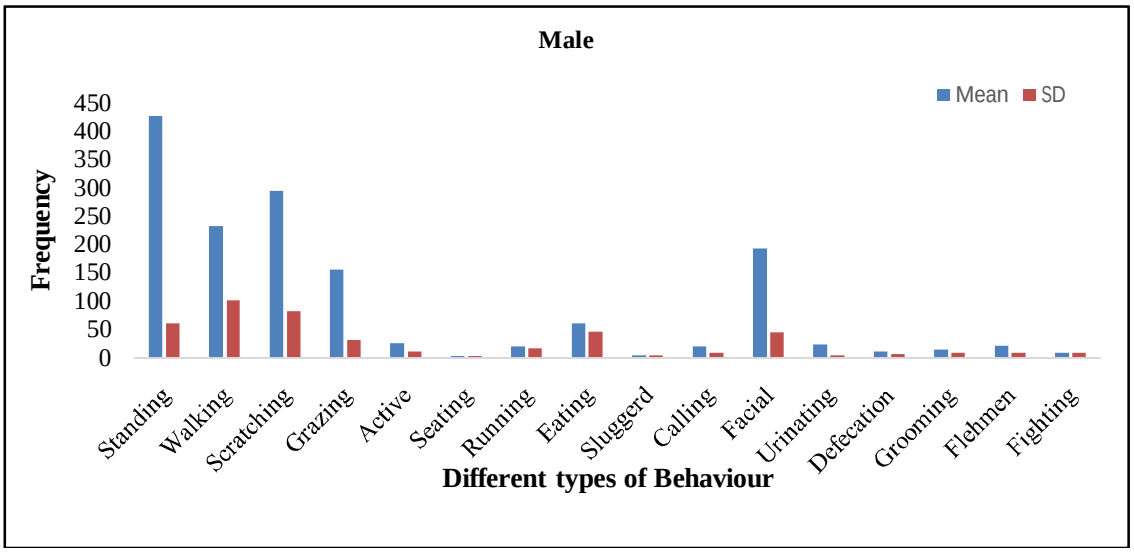

Figure 5: Mean and SD duration of behavioural activities of wild ass in Seven months for Male.

Figure 6 shows Female the Mean and SD duration of behavioural activities of wild ass in seven months.

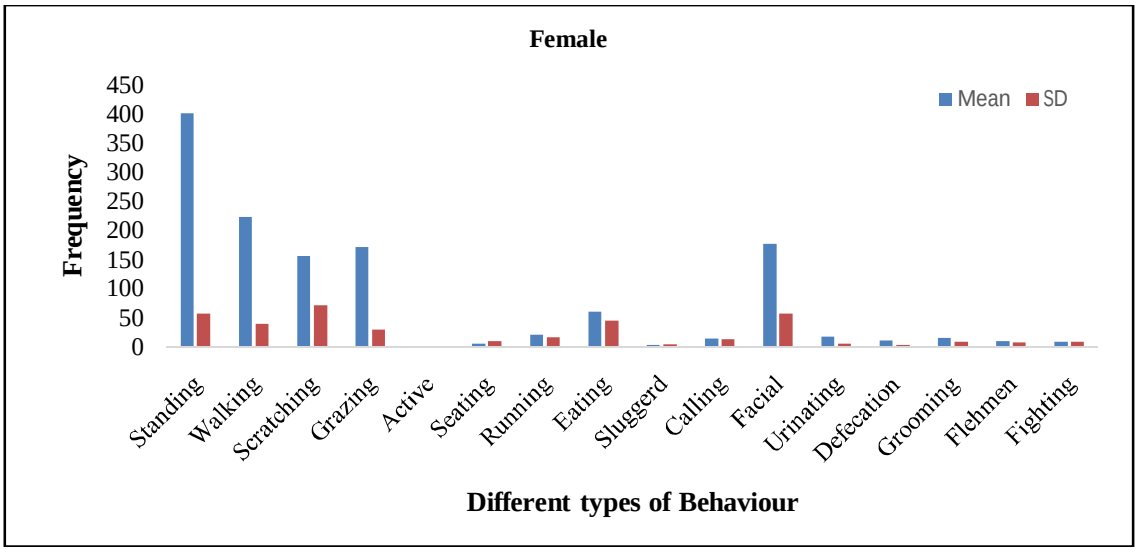

Figure 6: Mean and SD duration of behavioural activities of wild ass in Seven months for Female.

Figure 7 shows behavioural time budget of Asiatic wild ass in different seasons.

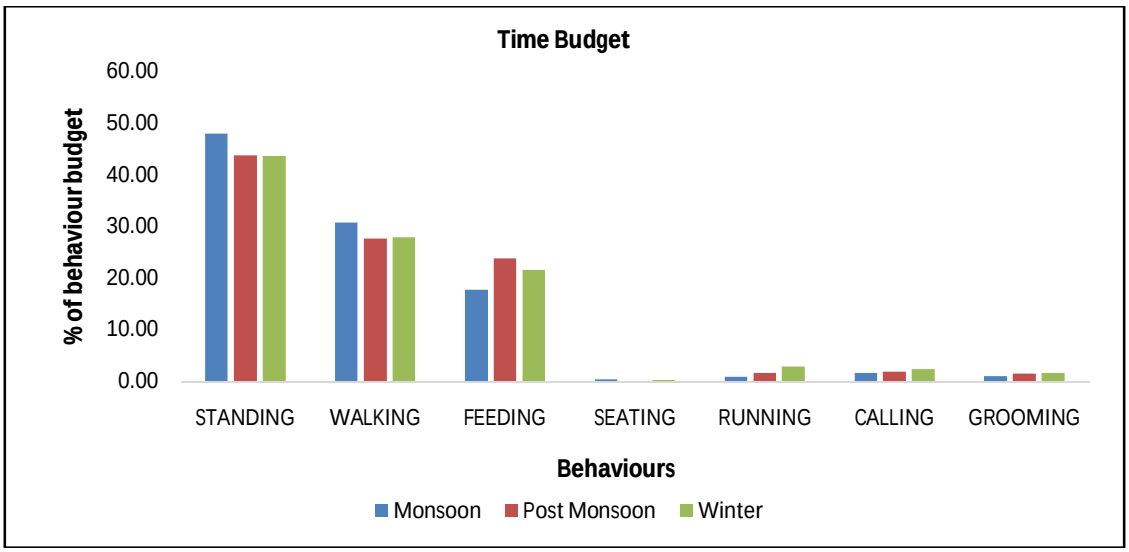

Figure 7: Behavioural time budget of Asiatic wild ass in different season.

Fig. 8: Scratching behaviour

Fig. 9: Standing behaviour

Fig. 10: Walking behaviour

Fig. 11: Defecation behaviour

Fig. 12: Grazing behaviour

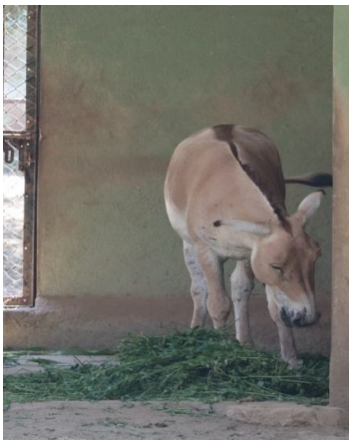

Fig. 13: Eating behaviour

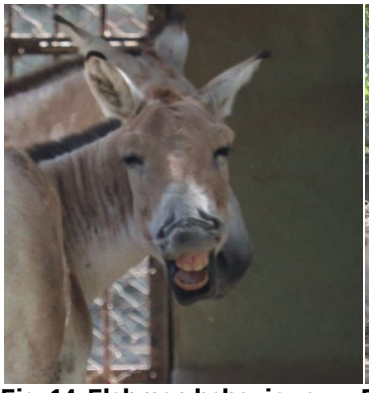
Fig. 14: Flehmen behaviour


Fig. 15: Adult Male


Fig. 16: Adult Female

CONCLUSSIONS

Based on the behavioral observations in captivity, we studied various behavior patterns. A significant difference was found in the different type of behaviors. This study was focused on behavioral activity of male and female. The result of this study provides different behavioral patterns like standing, walking, grazing, running, grooming, fighting etc. Difference was seen in the behavioral activity of wild ass in male and female. Standing behavior more frequent against eating behavior. When wild ass kept with female active for reproduction behavior in male was observed. Wild ass was in stress because of frequent presence of visitors near the cage. Sixteen behaviors were regularly studied when wild ass kept in pair (male & female). Wild Ass was found peace fully sharing food with one another. Behavior of wild ass was affected by seasonal variations.

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