



ACTIVITY BUDGET OF NILGIRI TAHR (*Nilgiri tragus*) IN DIFFERENT SEASONS IN THE WESTERN GHATS LANDSCAPE IN KERALA

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Abstract

The Nilgiri tahr is the caprine ungulate endemic to Western Ghats and the species is endangered due to isolated small population and fragmented habitats. The specialized habitat requirement for an anti-predator strategy makes the species fragmented reducing the viability of the population. The study was conducted in three habitats in the Western Ghats on the behavior of these gregarious ungulates which provide insights into the management of the species. The activity budget observations were recorded in the time period between 7.00 and 17.00 h and the scans were recorded. Taking all scans together grazing (37.4 %) was observed as the predominant activity followed by resting (23.3 %). Walking (13 %), standing (11.8 %) and maintenance activities (11.4 %) occupied medium time shares, and browsing activity (0.8 %) was the lowest. A seasonal difference was observed in the activities with browsing and walking more in summer period. The difference

in activity budget was observed with sex of animals also with more browsing (1.7 %) and walking (17 %) in adult males.

Keywords: Nilgiri tahr, Activity budget, Behaviour

The Nilgiri tahr is the only extant caprine ungulate endemic to Western Ghats and was found in 18 locations spread over six landscapes in the states of Kerala and Tamilnadu. The species was having an isolated and fragmented distribution with small population in each habitat and the present total population of it was estimated to be within 1800-2000 (Daniel *et al.*, 2006). The tahr possess the specialized habitat requirement of grasslands adjacent to steep rocky cliffs as an anti-predator strategy which makes the species fragmented reducing the viability of the population (Prater, 1971). The social structure and behavior of

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most mountain ungulates were peculiar as observed by Bianchet (1991) in bighorn sheep where the social system was shaped by anti-predator and foraging strategies that rely upon learned traditions. The study on the behavior of gregarious ungulates will provide insights into the management of the species with special regard to their habitat management. Any long term conservation efforts will be fruitful only with a broad understanding on the activity pattern of the subject species. The present study investigated the activity budget of Nilgiri tahr in different habitats and its trend across seasons.

Materials and Methods

The study was conducted in the three habitats namely Kochupamba in Periyar Tiger Reserve, Nelliampathi in Nenmara Forest Division and Pettimudi in Eravikulam National Park in the three seasons of summer (February to May), monsoon (June to September) and post monsoon (October to January). The activity budget of the animals were observed using the behavior classification followed by Stronge *et al.* (1997) for feral goats with modification and included grazing, browsing, resting, standing, walking, maintenance and others.

The activity budget observations were recorded in the time period between 7.00 and 17.00 h and locations were traversed by foot to observe the animals. The scan sampling was done using 8 x 30 M binoculars and for each scan the observer observed the group in the same direction and selected, at random, a maximum of five animals in that group for recording. The recording was done in a rotational fashion by scanning and recording the behavior of a particular animal in that group for a minute, and then switching on to the next animal and then to the next animal so that in a five minute period one scan of all the five selected animals will be done. Then the second scan will proceed again in that group. Thus continuous observation and recording pattern was performed and only recordings with a minimum of 30 min continuous observation time were included in the data set for analysis. The maximum continuous observation time was taken as two hours after which scanning

was terminated. All the observations recorded were made by a single observer and whenever an anthropogenic disturbance occurred in between, the scan session was automatically terminated.

Results and discussion

A total time of 54 h were spent for the observation of the activity budget in the three habitats for the three seasons and total scan samples recorded were 2898. In general considering all seasons and habitats together grazing was the predominant activity observed occupying 37.4 percent time, followed by resting with 23.3 percent time. Walking (13%), standing (11.8%) and maintenance activities (11.4%) occupied medium time shares. The browsing activity (0.8 %) was the lowest and the rest time share of others (2.4%) included activities like agonism, sexual, nursing, play and vigilance. The general activity budget share of Nilgiritahr covering all seasons and habitats are presented (Fig 1).

Similar observation of higher share in feeding with 40 percent time share in summer and 60 percent share in spring was observed in Przewalski mares by Berger *et al.* (1999). Similarly Pairah *et al.* (2014) observed the behavior of reintroduced Javan deer and the results showed that all age-sex classes of the deer spend most of their time for feeding. Stronge *et al.* (1997) in their study on foraging behaviour of feral goats found that feeding was the dominant activity comprising 48.5 per cent time and resting was the second most common activity after feeding. Souris *et al.* (2007) also recorded time budget in Przewalski horses with more share in grazing at 46 percent, then resting 35 percent, walking 11 percent and standing one percent. This pattern was comparable to tahr in the study though the time share in feeding was less compared to horses and goats. The higher share of standing in tahr observed compared to horses may be due to the increased vigilance usual in mountain ungulates compared to larger herbivores like horses.

The seasonal difference in the activities were assessed and standing out from

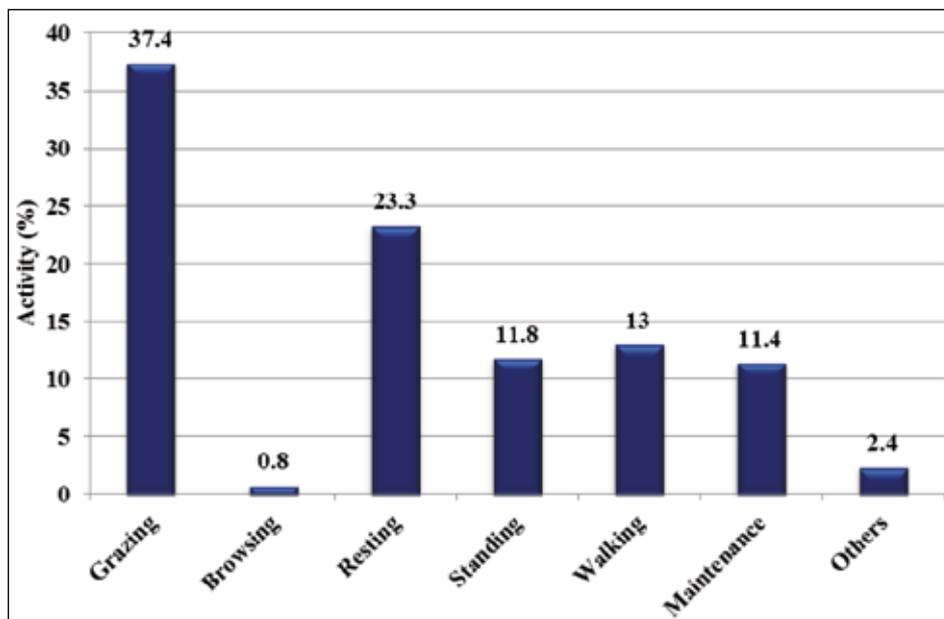


Figure 1. Activity budget of Nilgiri tahr in general

the general order, resting (31.1%) occupied a major share during monsoon immediately next to grazing (32%). Also browsing and walking was more in summer period in comparison with other two seasons. The detailed view of the activity budget of Nilgiritahr across the different seasons is presented in table 1.

Kone *et al.* (2006) also observed in their study in a natural pasture that during the dry season sheep and goats spent around 25% of their time browsing and 20% and 16% respectively, of their time in grazing. Thus seasonal bias towards browsing is observed in domestic caprines also. This is evident in tahrs also in resource poor seasons though the time share on browsing is too low compared to that of sheep and goat. Stronge *et al.* (1997) also reported that grazing generally decreased from autumn to summer, and browsing increased from summer to spring which is in agreement with the current study.

The sex and age of animals can definitely influence the activity of an animal and on assessment in the present study it was observed that adult males browsed (1.7 %) more in comparison to females and young ones. Also walking was more (17 %) in males when it was 11.9 percent in females and 12

percent in young ones. The detailed view of the activity budget of Nilgiri tahr across the different age-sex class is presented in table 2.

The study of Ruckstuhl (1998) in bighorn sheep found that females spent more time foraging and walking and had longer foraging and walking bouts than adult males and males spent more time lying down than females. That study agrees to our observation in the present study in case of foraging and is in contrast with regard to walking. Stronge *et al.* (1997) also reported that feral goat females spend significantly more time for feeding (53%) than males (44%) and his finding of males browsing more than females was also evident in tahr in this study. Pairahet *et al.* (2014) observed that in reintroduced Javan deer there was no significant difference between all age-sex variation for all activities pattern although adult female dedicated more time for feeding than adult male and adult male spent more time for other activities than fawn.

In general it can be observed that the activity budget of Nilgiri tahr was in agreement with the behavior of other ungulates finding more time in foraging to fill the rumen and then for resting and ruminating. They were not observed to be a generalist herbivore and have

Table 1. Activity budget in different season

Activity	Summer		Monsoon		Post monsoon		Total	
	Scan	Percent	Scan	Percent	Scan	Percent	Scan	Percent
Grazing	360	38.2	261	32.0	462	40.5	1083	37.4
Browsing	12	1.3	9	1.1	3	0.3	24	0.8
Resting	160	17.0	254	31.1	260	22.8	674	23.3
Standing	111	11.8	64	7.8	166	14.6	341	11.8
Walking	152	16.1	103	12.6	121	10.6	376	13.0
Maintenance	87	9.2	120	14.7	124	10.9	331	11.4
Others	60	6.4	5	0.6	4	0.4	69	2.4
Total	942	100.0	816	100.0	1140	100.0	2898	100.0

Chi square = 190.515** p-value < 0.001

** Significant at 0.01 level

Table 2. Activity budget in different age sex class

Activity	Adult Male		Adult Female		Young		Total	
	Scan	Percent	Scan	Percent	Scan	Percent	Scan	Percent
Grazing	207	35.2	672	39.3	204	34.0	1083	37.4
Browsing	10	1.7	13	0.8	1	0.2	24	0.8
Resting	121	20.6	402	23.5	151	25.2	674	23.3
Standing	63	10.7	201	11.8	77	12.8	341	11.8
Walking	100	17.0	204	11.9	72	12.0	376	13.0
Maintenance	62	10.5	196	11.5	73	12.2	331	11.4
Others	25	4.3	22	1.3	22	3.7	69	2.4
Total	588	100.0	1710	100.0	600	100.0	2898	100.0

Chi square = 48.216** p-value < 0.001

** Significant at 0.01 level

predominant grazing, and the treading away from general behavior of ungulates was with regard to their survival strategies in the unique habitats and in changing seasons.

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