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BEHAVIOUR OF BLACKBUCK, *ANTILOPE CERVICAPRA CERVICAPRA* (LINNAEUS) DURING SOLAR ECLIPSE OF 1980.

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INTRODUCTION

The valuable population of blacbuck in the Guindy Forest Park in Madras, Tamil Nadu has been the subject of a preliminary eco-behavioural study by us for the last two years (Menon and Kurup, under preparation). Considerable baseline data already acquired on the daily activity profile of this animal made the species particularly suitable for a comparative study of the bebaviour during the eclipse. However, a more specific control period immediately preceding the eclipse was used for direct comparison with that of the activity pattern during the eclipse. Blackbuck is adapted for a life in the blazing plains and meadows of the drier regions and thus possesses a much higher tolerance thresh-hold for direct sun which makes it more diurnal than many other species of ungulates. They tolerate a thermal limit of 90°F (32°C) in the shade for normal grazing in Kanha Park (Schaller, 1967) and upto 41°C at Guindy Park (our studies *op. cit*). At the same time they show considerable temporal variation in the timings of daily activity schedule in different seasons, responding to change in light intensity among other things. Schaller (*op. cit*) noted as much as one hour differential in the rising and first feeding time between cool and hot weather seasons.

Similarly, rutting seasons also varies in different regions, depending on the physical parameters, of which light intensity and temperature appear to be most significant.

As both these parameters suddenly change during the brief period of a solar eclipse, blackbuck hehaviour during this time was expected to show changes. However it is to be borne in mind that phenomena lika eclipses are rare events of short duration and as such data collected during such studies might indicate only broad trends difficult to prove significant statistically or otherwise.

Study Locale

Guindy park is a small relic of the characteristic dry deciduous thorn forest and scrub savanna once present extensively throughout the Coromandel (eastern) coast of Peninsular India. Originally it formed part of the present Governor's Estate of which only 380 acres now remain intact and under the control of State Forest Department. The blackbuck, along with an even greater population of spotted deer, continues to range in the adjoining campus of Indian Institute of Technology aud the Governor's Estate as in the past, which were all part of the original area. Observations were carried out mainly in the disused Polo field, which is a grassy maidan and a favourite haunt of the animals round the year.

Study Methods

The solar eclipse took place on 16 February 1980, lasting from 14. 17 hrs to 17.00 hrs across Peninsular India in a belt of 135 kms. At Madras it started at 14.39 hrs attaining totality around 15.44 hrs. It was considered necessary to have a specific timeset of control observations immediately preceding the eclipse for direct comparison. Accordingly three hour's observations from 14 to 17 hrs. were carried out during the 3 days prior to the eclipsc day. Observations were carried out from cover. Instataneous sampling at one minute interval using scan method (Altmann, 1974) was used

to collect the data. At each scan, activities of three individuals were recorded.

SIGHT AND SOUND EVENTS

A time sequential recording of the general sight and sound events beginning 20 minutes prior to the start, and through most part of the eclipse, providing a sort of back drop for the black buck behaviour was also recorded which is summarised below.

Time	Events	Time	Events
14.24	Partridges calling	15.28	A hush, scene very quite, cool breeze.
14.30	Coppersmith calling	15.38	Doves cooing
14.37	Crows eawing ; Partridges calling	15.41	Owls vocalizing
14.39	Partridges calling	15.43	Parrots vocalizing
14.41	Partridges calling	15.44	Parrot, crows, partridges vocalizing, DUSKINESS, hush
14.47	Crows cawing ; Partridges calling	15.50	Hush continues
14.48	Koel cooying	16.09	Hush continues
15.03	Crows cawing ; Bulbul twittering	16.09	First bird call after peak of eclipse (15.45) Doves cooying.
15.09	Bulbul twittering	16.16	Much cooing of doves
15.12	Birds twittering ; Partridges out feeding	16.23	Light brightens
15.23	Crows cawing	16.34	Light almost normal
15.24	Parrot flying homewards, light fading		

Against a single bird call during 20 minutes prior to the eclipse there was a spate of six calls by at least four identifiable species of birds during the peak of the eclipse.

RESULTS

An activity profile of four main categories were recorded. These were grazing, resting, standing and walking. Grazing and walking measure active trends and the other two gauge the inactive trends. Standing, however, can also be considered as a transient and intermediary state leading forward to activation or reverting backwards to resting state. In the present context of eclipse effect, it also appears to denote an indecisive, uncomprehending state.

The fluctuation of the activity profile during the eclipse is plotted in the text figures 1 and 2. Variations have been examined by means of ten minute intervals beginning from 14.39 hours at the start of the eclipse to 16.29 hours just six minutes before its conclusion and light intensity was near normal.

Grazing : During the first 30 minutes of the eclipse there was a pronounced increase in grazing which rises to a

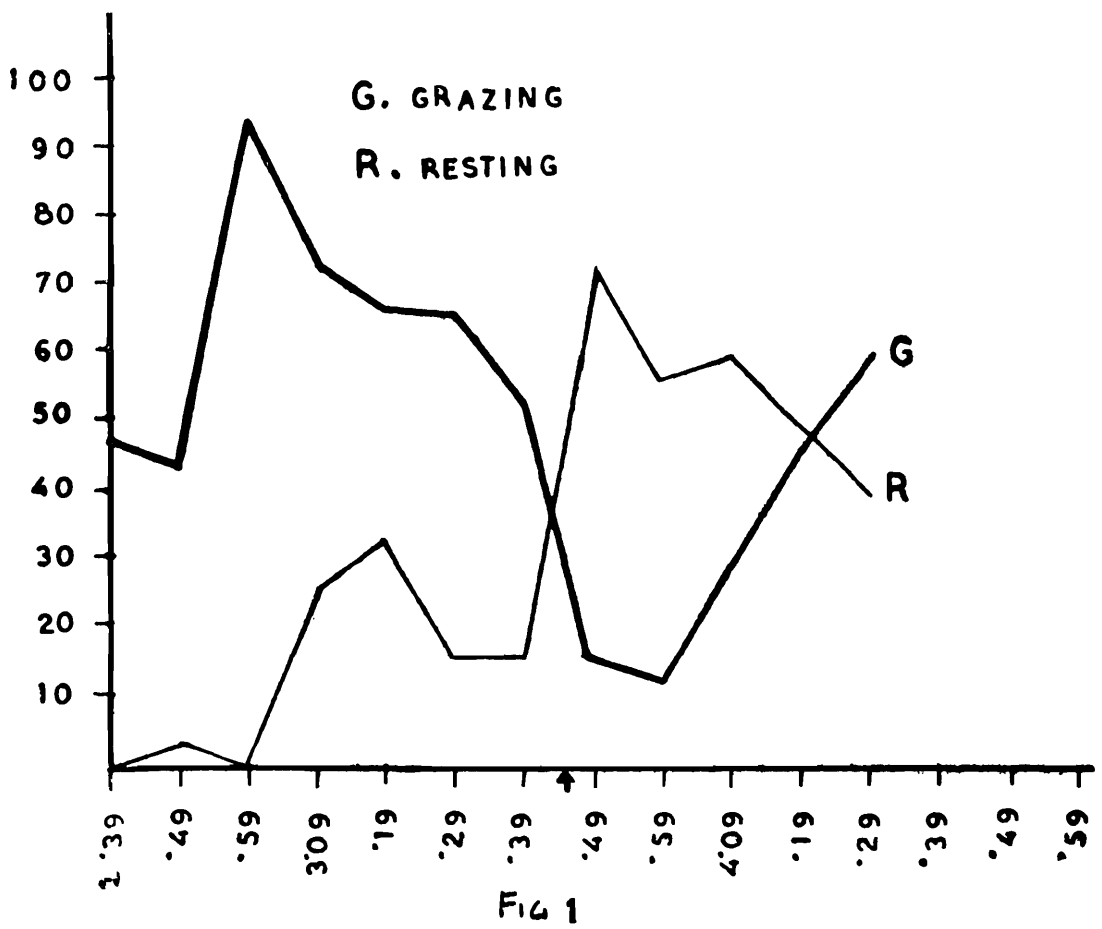

Fig. 1. Progress of grazing and resting activity during the eclipse. Arrow in this and next indicates totality. G : Grazing ; R : resting.

maximum of 93.33% of all activity. But thereafter grazing activity starts to decline to continue at moderate rate (Fig. 1) for the next 40 minutes. Then again occurs a further steep decline which seems to take place around the time close to the totality of the eclipse. Grazing is not seriously picked up till about 10 to 13 minutes after the totality but after this it steadily increases to form more than 60% of the activities towards the end of the eclipse.

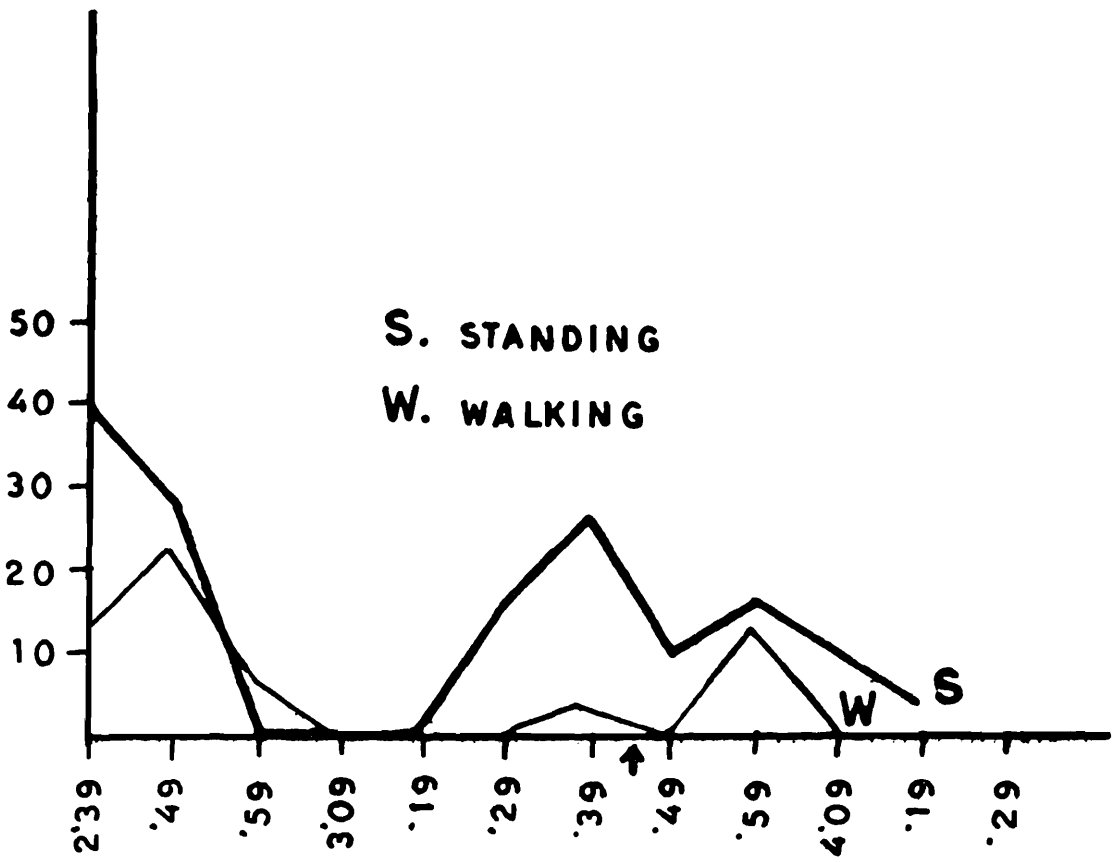

FIG 2

Fig. 2. Progress of standing and walking activities during the eclipse. S : Standing ; W : Walking.

Resting : The normal level of resting usual at this time of day started to increase half an hour after the commencement of the eclipse. This lasted for 20 minutes when this increase of resting stopped and gave way for an increase in standing, that is, while grazing animals continued to graze, more of the resting animals started to rise and stand.

This switch over to increased standing from resting activity lasted for another 20 minutes. Thereafter resting started to increase and became widespread and peaked around totality. But there was an immediate decline of resting soon after the totality, standing and walking increasing in its place.

Standing : Standing showed a complementary pattern to that of grazing (fig. 2). At the start of the eclipse there was a fall in the rate of standing corresponding to the rise in grazing. This also denotes that standing at this time is

in fact a forward prelude to grazing and not a reverting state to resting. Standing increased and reached its peak just five minutes before totality and at this time however it was apparently at the expense of both grazing and resting.

Walking : The immediately striking thing about walking is its minimal amount and its fluctuation pattern closely resembling that of standing. Walking or apparently purposeless movement was not much evident during the eclipse. The slight reduction in the early stage of eclipse resulted in an increase in grazing.

Comparison with activity profile of the normal control period :

Activity profile of the pre-eclipse control sample showed a mean of 36% resting, 32.5% standing, 27.5% grazing and walking limited to a more 5%. Animals thus spent 67.5% of their time in resting or idly standing, indicating that this time of the day (14 hrs) is generally an inactive period. (Fig. 3). The very small amount of walking (5%), the second denoter of active state after the grazing is also supportive of the inactive tendency. Thus the predominant aspect of blackbuck behaviour normally at this time of the day is an inactive state.

Comparing to the activity profile during the eclipse period, it is seen that while the general pattern is more or less retained, the degree of change in each of these aspects is distinct. Resting doubles itself to a peak of 73%, whereas grazing, standing and walking drop precipitously. Grazing is reduced from 27.5% to 14% which is 49% reduction. Similarly standing is drastically reduced from that of normal period from 32.5% to a mere 11%, a 65% reduction. Walking goes down from 5% to 2%. However, grazing although falling to almost half the normal time, is during the eclipse the second major activity, instead of standing, which was the major activity during the former period. This is not readily explained except for the fact which was quite apparent, that this was not serious feeding. Blackbuck is often observed to about feigned feeding as a displacement activity to relieve tension during agonism or at times of

noncomprehension such as when confronted by unfamiliar objects (Kurup & Menon, op. cit.). A part of the grazing

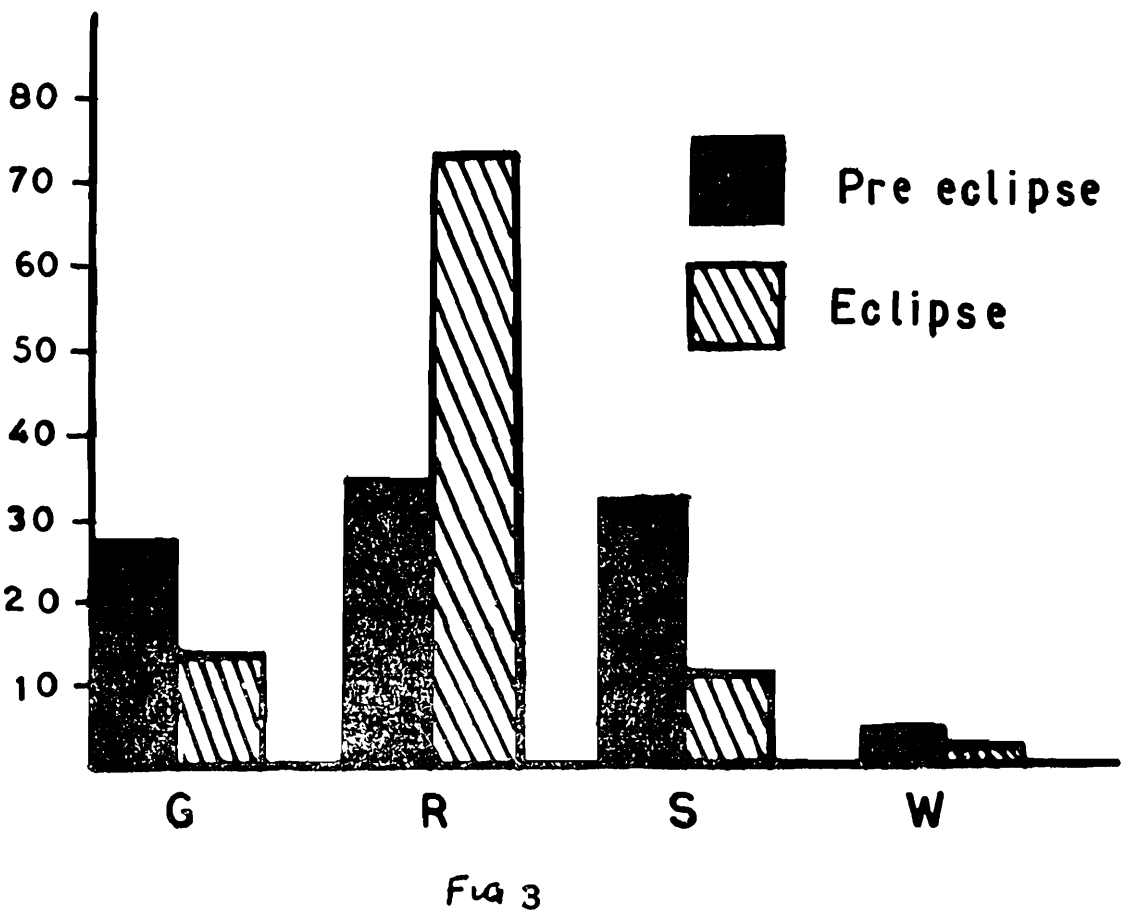

Fig 3

Fig. 3. Time budget of four major activities of blackbuck before and during eclipse compared. G : Grazing R : Resting S : Standing and W : Walking.

thus might have been a manifestation of a displacement response to the eclipse effect.

To sum up, the fluctuation of general activity profile of the blackbuck herd showed a trend to increase in the first half hour of the eclipse. Thereafter the general trend of decreasing activity and increasing inactivity manifests and progresses. It is briefly disturbed by an interlude of resting, individuals standing up as if faintly disturbed and puzzled. Approaching the peak of eclipse, the activity state denoted by grazing, drastically declines. The inactive resting state rises steeply to attain the peak at the totality of the eclipse. As soon as the totality is over, the resting is curtailed with resumption of activity. There is increased standing and walking, but

grazing is resumed only after about ten minutes, suggesting a sense of puzzlement. Thus a faint sense of puzzlement is apparent both before and after the peak of the eclipse.

Summary

A comparative study of the behaviour of blackbuck was conducted in the Guindy Park, Madras, Tamil Nadu, during the solar eclipse of 1980. Activity profiles immediately before and during the eclipse were studied with regard to four main activities of grazing, walking, standing and resting. It is shown that compared to pre-eclipse control period, during eclipse, there was a detectable decline in active state and a conspicuous increase in inactive state. As regards activity fluctuation during the course of the eclipse, there was a general increase of activity in the first half hour of the eclipse, but after this a general trend of decreasing activity and increasing inactivity set in reaching their respective maxima at the totality. The fluctuation pattern is indicative of the occurrence of a faint sense of puzzlement both before and after the peak of the eclipse.

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