

**ACTIVITY TIME BUDGET OF ASIAN ELEPHANTS  
(*ELEPHAS MAXIMUS* L.) IN IDUKKI WILDLIFE SANCTUARY,  
KERALA, SOUTH INDIA.**

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### Introduction

Information on activity time budget of animals helps in the analyses of their foraging and survival strategies. This, combined with energy costs of various activities can provide energy expenditure estimates for the species. Activity time budget is expected to vary according to the habitat, temperature and rainfall. Several studies on activity pattern of mammals have stressed the need for detailed investigations on the activity pattern and time budget of different species (Jarman and Jarman, 1973; Irby, 1982; Deag, 1985; Chattopadhyay and Bhattacharya, 1986). Activity time budget of African Elephants have been comparatively well studied (Carrington, 1958; Laws, 1970; Douglas-Hamilton, 1972; Wyatt and Eltringham, 1974; Guy, 1976). Only very few studies have been made on the activity pattern of Asian Elephants (McKay, 1973; Vancuylenburg, 1977; Easa, 1989).

The present study on activity time budget and the time spent on different categories of feeding was made in Idukki Wildlife Sanctuary, Kerala during 1993-94.

### Study Area

The Idukki Wildlife Sanctuary (9° 45'

to 9° 55' N and 76° 50' to 77° 05' E) covers an area of 77 km<sup>2</sup>, including 33 km<sup>2</sup> of water spread. The area falls in Nagarampara Reserve Forest of Western Ghats and forms the catchment of Idukki Hydel Project. The climate of the area is cool and humid with temperature ranging between 13° to 29°C. The average annual precipitation is 4100 mm. Physiographically the area is hilly with elevation ranging from 800 m to 1000 m. The whole area is drained by river Periyar and its tributaries. The habitat includes evergreen, semi-evergreen and moist deciduous forests and grasslands.

### Methods

The Sanctuary area was divided into four major habitat types namely tropical evergreen, semi-evergreen and moist deciduous forests and grasslands. Direct observation of Elephant herd was made from 0600 to 1800 hrs to record activities. Care was taken to distribute the observation hours in proportion to the extent of habitat types and were spread over two seasons, dry (January - April) and wet (May - December) seasons. The activities were divided only into two categories - the feeding and drinking. The feeding was further divided into grazing (feeding on grasses and sedges), browsing (feeding on shrubs, bamboos and tree leaves) and debarking

(feeding on barks of trees and tall shrubs). A total of 107 animal contact hours were spent for observation of which 55 hours were in dry season and 52 hours in wet season. Student's t-test was carried out to find the influence of season on the total time spent in feeding and drinking. The influence of season on proportion of time spent in various categories of feeding was also tested through a student's t-test.

### Results and Discussions

Feeding accounted for 65.45% of the activity in dry season whereas it was 80.77% in wet season. There was a significant difference between seasons in the time spent for feeding (Table 1). The time spent in drinking varied from 2.73% in dry season to 1.92% in wet season. The seasonal difference in time spent in drinking was found to be non-significant (Table 1).

Grazing was predominant in both dry (63.89%) and wet (71.43%) seasons. There was no significant seasonal difference in the proportion of time spent in grazing, browsing and debarking in the study area (Table 2).

Several authors have reported that African Elephants feed for 16 to 18 hours a day (Laws, 1970; Douglas-Hamilton, 1972). Guy (1976) estimated 12 to 14 hours of

feeding per day in Sengwa area. Vancuylenburg (1977) recorded 17 to 19 hours of feeding time for Asian Elephants in Sri Lanka. Easa (1989) reported that the Elephants in Parambikulam spent about 65% of the time for feeding. The present observation agrees with these earlier investigations. The time spent on feeding by Elephants in dry season was comparatively low. Disturbances due to fire, tourism and forestry operations are at its peak during this period. This resulted in a low availability of grasses and sedges in dry season and the Elephants used to spend most of their time in evergreen patches. A comparatively high intake of water in dry season indicate a higher requirement to cope with the hot climate.

Seasonal differences in the proportion of time spent in grazing, browsing and debarking have been reported in African Elephants (Buss, 1961; Field, 1971; Wyatt and Eltringham, 1974; Laws *et al.*, 1975; Guy, 1976; Barnes, 1982; Kalemara, 1989; Kabigumila, 1993). Ishawaran (1984), Sukumar (1985), Santiapillai *et al.* (1984) and Santiapillai and Suprahman (1986) have reported similar observations in Asian Elephants. These investigations have indicated a preference for browsing in dry season and grazing in wet season. However, Easa (1989) showed that the Elephants in Parambikulam Sanctuary spent more time

**Table 1**  
*The proportion of time spent in feeding and drinking by  
Elephants in Idukki Wildlife Sanctuary*

Seasons	Feeding		Drinking	
	Mean	S.D.	Mean	S.D.
Dry	67.10	11.89	2.71	2.48
Wet	80.89	7.08	1.96	2.85
t-value	-3.15*		0.67(NS)	

\*= Significant

**Table 2**  
*The proportion of time spent in various categories of feeding by Elephants in Idukki Wildlife Sanctuary*

Seasons	Feeding category					
	Grazing		Browsing		Debarking	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Dry	61.92	14.13	23.00	7.34	15.07	13.14
Wet	71.78	8.89	21.29	9.37	6.97	6.42
t-value	-1.88(NS)		3.76(NS)		1.76(NS)	

in grazing in dry season and browsing in wet season. But in the present study area grazing was predominant in both dry and wet seasons. This may be due to the fact that the area is dominated by grasslands. Feeding on bark is observed throughout the year. Easa (1989) also reported the bark feeding behaviour of Elephants in Parambikulam Sanctuary. Lawset al. (1975)

suggested that supplementation of the diet with fibrous bark was to maintain an optimum fibre protein ratio.

The present study indicates the importance of the grasslands in Idukki Wildlife Sanctuary in order to conserve the species.

## SUMMARY

The present study on the activity time budget of Asian Elephants (*Elephas maximus* Linn.) was carried out in Idukki Wildlife Sanctuary, Kerala during 1993-94. Feeding accounted for 65.45% of the activity in dry season and 80.77% in wet season. Drinking was found to vary from 2.73% of the activity in dry season to 1.92% in wet season. There was a significant seasonal difference in time spent on feeding whereas it was found to be non-significant for drinking. Grazing was predominant in both dry (63.89%) and wet (71.43%) seasons, indicating the importance of grasslands for the conservation of the species.

इडुक्की वन्य प्राणी संश्रय, केरल, दक्षिण भारत में एशियाई हाथी (एलिफस मैक्सिमस लि.)

की सक्रियता का समय विभाजन

टी०आर० विनोद व जैकब वी० चीरन

सारांश

एशियाई हाथी (एलिफस मैक्सिमस लि.) की सक्रियता के समय विभाजन का यह अध्ययन 1993-94 के दौरान इडुक्की वन्य प्राणी संश्रय, केरल में किया गया। सूखे मौसम में सक्रियता का 65.45% समय तथा आर्द्र मौसम में उसका 80.77% समय खाने में लगा। पानी पीने में लगा समय सूखे मौसम में सक्रियता के 2.73% से आर्द्र मौसम में उसके 1.92% तक रहा। खाने में व्यतीत हुए समय में सार्थक मौसमी अन्तर पाया गया किन्तु पानी पीने में लगे समय में इसमें कोई खास अर्थवान अन्तर नहीं निकला। सूखे मौसम (63.89%) और आर्द्र मौसम (71.43%) दोनों में लगा। चरने का समय सबसे ज्यादा रहा जो इस जाति का संरक्षण करने के लिए घासभूमि के महत्व की ओर संकेत करता है।

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