

Habitat use and food habits of Indian Peafowl *Pavo cristatus* in Anaikatty Hills, Western Ghats

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Fig. 1. Indian Peafowl *Pavo cristatus*.
Photo: P. Manikandan

Abstract

This paper discusses habitat utilisation, time-activity budget, food and feeding habits, and roost tree utilisation of Indian Peafowl *Pavo cristatus* in Anaikatty Hills, Western Ghats. The peafowl population in the study area (2 km²) was estimated to be 21. Sixteen trees belonging to four species were used for roosting. About 50% of the roost trees were the thorny *Acacia polyacantha*, located near streams. Although the diet of peafowl constituted both animal and vegetable matter, vegetable matter comprised 91%.

Introduction

The Indian Peafowl *Pavo cristatus* (Galliformes: Phasianidae) is the national bird of India, and is common and widely distributed in the Indian Subcontinent (Ali & Ripley 1987). However, its distribution is patchy and ranges from the Himalayas in the north to peninsular India in the south. In Tamil Nadu, peafowl population is abundant in Pudukottai, Madurai, Ramanathapuram, Nilgiri, and Coimbatore districts (Veeramani & Sathyanarayana 1999; Krishnakumar 2003). The species is virtually an omnivorous and opportunistic feeder on a wide variety of insects, plants, seeds, tender shoot, amphibians, reptiles, and worms (Baker & Inglis 1930; Ali & Ripley 1987; Trivedi & Johnsingh 1995). It serves as a flagship species for wildlife conservation, particularly outside protected areas. Today, its population is facing a severe threat due to habitat destruction, poaching, and contamination of its food source, even though it is protected under Schedule 1 of the Wild Life (Protection) Act, 1972. Despite its wide distribution, there have been very few ecological studies on peafowl populations (Sharma 1979; Johnsingh & Murali 1980; Trivedi & Johnsingh 1995; Yasmin & Yahya 1996; Yasmin 1997; Veeramani & Sathyanarayana 1999). Due to the high degradation rate of its natural habitats, there is an urgent need to understand the ecological requirements of wild populations of peafowl. The objective of this study was to assess its food habits, habitat use, and to identify its roost sites.

Study area

The study was carried out in and around the Sálim Ali Centre for Ornithology and Natural History (SACON) campus (25 ha), located at Moongilpallam, in Anaikatty Hills, Western Ghats, 25 km north-west of Coimbatore city in Tamil Nadu. It borders private land on two sides, and Anaikatty Reserve Forest on another (11°5'N–11°31'N, 76°39'E–76°49'E). It comprises various habitats, namely, scrub jungle and open barren lands in SACON campus, and mixed dry deciduous forest and agricultural fields outside the campus. The reserve forests of this landscape

come under the Coimbatore Forest Division, Tamil Nadu. A non-perennial stream, Perumpallam, flows on its western side. SACON campus has scrub jungles and vast open areas with scattered bushes. The extent of the study area was c. 2 km². Anaikatty Reserve Forest is situated in the foothills of Nilgiris, at an elevation of c. 610–750 m AMSL. The average rainfall is about 670 mm, mostly received during the north-eastern monsoon. The study was conducted from December 2004 to March 2005.

Methods

Peafowl were directly observed under natural conditions during three time periods: 0600–1000 hrs, 1000–1400 hrs, and 1400–1800 hrs respectively. Observations were recorded in a field notebook and duration of each observation was noted with a stopwatch. When a bird was sighted it was followed to the extent possible. The time activity budget was determined by focal animal sampling method (Altmann 1974) with the aid of binoculars. The following behavioural activities were recorded.

- Calling: Uttered a loud call that sounded like, "he-on." A call might normally contain one to four syllables; sometimes extending up to seven.
- Displaying: Male spreading, vibrating train feathers.
- Feeding: Pecking any object actively on the ground or pulling at the vegetation.
- Flying: Bird observed in flight from the roost tree at dawn, or towards the roost tree at dusk, or while changing a feeding location.
- Moving: Primary form of peafowl locomotion, without any engagements.
- Preening: Running the bill through feathers while standing or sitting.
- Resting: Sitting on a tree or stone pillar without any activity.

In order to assess their diet, food items were divided into plant (leaf, shoot, flower, fruit, and seed), and animal (insect, and other) components. The type of food consumed and the number of instances of feeding were recorded for each observation. In addition, droppings were collected at roosting sites. Samples of dry droppings were teased apart and sieved to standard microns (355–1022 microns), and isolated. Undigested plant and animal matter was weighed separately on an electronic weighing scale.

In order to understand the roosting behavior of peafowl, observations were made in the early morning and late evening. Because peafowl regularly roost during dusk, and congregate till dawn, Sharma (1979) suggested that the counting of peafowl at roosting sites at dusk and dawn could be used to determine their abundance. Whenever a roost tree was located, it was marked with paint, and various parameters such as tree height,

site location and elevation, distance from waterbody, distance from human path/road, canopy cover, and roosting height were recorded. Whenever roosting behavior was observed, time of arrival, time of settling, and flock size were noted.

In order to assess the role of peafowl in seed dispersal of their food plants, seeds of one of its common food plants, *Ziziphus oenoplia* (Rhamnaceae) were collected from droppings, planted in a nursery bed at SACON campus, and observed for germination success.

Results

Population: Counts at roosting trees revealed the presence of 21 peafowl in and around SACON campus, comprising 17 males, and four females. Since the study period coincided with their breeding season, it is presumed that the number of females sighted was fewer.

Time activity pattern: During the study period, peafowl showed seven major types of behaviour. 'Moving,' was the most frequently observed behaviour (38.10%), followed by feeding (27.93%), and resting (24%). Less frequently observed behaviour included preening (4.31%), flight (2.60%), calling (2.52%), and display (0.36%).

Food and feeding habits: In Anaikatty Hills, peafowl consumed both, plant, and animal matter. A list of food consumed is given in Appendix 1. Vegetable matter (91.02%) constituted the major proportion of food (Table 1). Animal matter (8.97 %) constituted only a lesser proportion (Table 1). Analyses of droppings also revealed that the diet of peafowl mainly constituted the vegetable matter (Table 2). Undamaged seeds of *Lantana camara* and *Ziziphus oenoplia* were commonly noticed in peafowl droppings. **Roosting habits:** In Anaikatty Hills, peafowl used 16 trees belonging to four species, for roosting. Of these, eight (50%) were *Acacia polyacantha*. The others included *Tamarindus indica* (31.25%), *Eucalyptus longifolia* (12.50%), and *Ailanthus excelsa* (6.25%). It is interesting to note that peafowl roosted at different heights. A roost height of 10–13 m (50%) above ground level was preferred, to other roost heights: 7–10 m (6.25%), 13–16 m (25.0%), 16–18 m (12.5%), and 19–22 m (6.25%).

Habitat use: Peafowl, though inhabiting dry mixed deciduous forest, showed greater preference for scrub jungle (45%), followed by agricultural fields (32%), open barren land (13%), and mixed dry deciduous forest (10%).

Peafowl's role in seed dispersal: Of the 30 *Ziziphus oenoplia* seeds planted in the nursery bed, 12 (40%) germinated successfully. From this observation it is evident that the Indian Peafowl aids in dispersing the seeds of food plants it consumes.

Discussion

Activity pattern: 'Moving' was the most frequently observed activity, recorded in all the habitats. The probable reason for such a high mobility could be due to the dry vegetation, and low levels of food availability, forcing peafowl to move a lot to forage, and meet out their food requirements. 'Resting' was also found to be one of the major activities. Ali & Ripley (1987) mentioned that peafowl use undergrowth thickets of shrubby bushes during mid-day to avoid the heat of the sun. 'Calling' was more at dawn and dusk. Peafowl utter alarm calls, when predators approach them. 'Preening' was observed mostly in the early mornings before foraging started, whereas 'flight' occurred mainly before moving to a roosting site, or from the roosting site, when disturbed by

Table 1. Proportion of various food items consumed by Indian Peafowl during direct observations

Food item	Feeding observations	
	#	%
Vegetable matter		
Leaves, Shoots	73	34.43
Seeds	59	27.83
Fruits	35	16.50
Flowers	26	12.26
Animal matter		
Insects	18	8.49
Earthworm	01	0.48

predators. **Food habits:** Peafowl is an opportunistic feeder and an omnivore. Sathyanarayana (2005a, b), and Chakravarthy & Thyagaraj (2005) mentioned that peafowl are mainly granivores as they chiefly feed on paddy in the agricultural ecosystem. They are considered pests in the agricultural ecosystem. Yasmin & Yahya (1996) recorded that peafowl feed on a mixture of seeds, leaves, and wild herbs such as, *Achyranthes alternifolia*, *Amaranthus viridis*, *Dendrocalamus strictus*, *Setaria verticillata*, *Panicum antidotale*, *Dichanthium annulatum*, and flowers of *Bombax ceiba*. Johnsingh & Murali (1980) reported that peafowl feed on a wide range of crops such as groundnut, tomato, paddy, chilly and bananas in the cultivated areas. By analysing crop content, Johnsingh & Murali (1980) reported various food constituents such as leaves (*Digera arvensis*, *Centella asiatica*, *Allium cepa*), flowers (*Musa paradisiaca*), grass seeds (*Echinochloa colona*, *Panicum repens*), fruit (*Croton sparsiflorus*), seed (*Acacia arabica*), chilly, paddy, and animal constituents such as grasshopper, black beetle, ants, and termites. Peafowl's diet in Anaikatty Hills comprised seeds (13 spp.), fruits (9), shoots (8), leaves (6) and flowers (4), in addition to invertebrate food, which indicates its omnivorous food habit. Droppings contained chiefly vegetable components (leaves, twigs, seeds, shoots, and fruits), hard undigested remains of insects, and grit. In order to get minerals and grind the food, peafowl consume grit in small quantities. The dropping contained a large proportion of *Ziziphus oenoplia* fruits. Trivedi & Johnsingh (1995), and Veeramani & Sathyanarayana (1999) reported that fruits of *Ziziphus jujuba* formed a favourite food for peafowl in Gir Forest and Mudumalai Wildlife Sanctuary respectively. In all, in the natural habitat, Indian Peafowl mainly feeds on grass seeds, tender leaves and shoots of herbaceous species, various flowers, and *Ziziphus* spp., fruits; and in the agricultural landscape it consumes paddy, finger millet, ground nut, and other vegetable crops such as tomatoes.

Roosting behaviour and roost tree utilization:

In Anaikatty Hills, Indian Peafowl favoured *Acacia polyacantha* for roosting because they are thorny, they afford a multi-directional view, they generally grow close to water and in bushy undergrowth, and their first branch is at maximum preferred height above ground. These factors help peafowl escape predators. Navaneethakannan (1984), and Veeramani & Sathyanarayana (1999) reported that it preferred to roost on densely foliaceous tree species like *Pongamia pinnata* and *Holoptelia integrifolia*. Parasharya & Mukherjee (1999) reported that peafowl roosted on electric poles in Ahmedabad, and pointed out that that might be a behavioural adaptation to reduce predator threat.

In Anaikatty Hills, peafowl roosted at a height ranging from seven to 22 m, favouring a range between 10–13 m.

Table 2. Percentage proportion of various food items recorded in the droppings of Indian Peafowl

Food item	Weight (gm)	%
Fibres and husks	115.75	80.59
Seeds	25.93	18.05
Insects	0.11	0.08
Bones	0.07	0.05
Grit	1.77	1.23

Veeramani & Sathyanarayana (1999) recorded that peafowl roost at a height of 16–22 m, and in Gir forest they frequently roosted at 15 m (Trivedi & Johnsingh 1996). From these observations it can be surmised that they prefer tall trees for roosting, probably to escape from the predators. Sharma (1979), and Ali & Ripley (1987) mention that peafowl regularly roost on the same tree for generations, but during the present study, frequent changing of roost trees was observed. Inside SACON campus, peafowl changed their roosting site from *Acacia* spp., to *Eucalyptus* spp., and vice versa. This showed their high alertness as mentioned by Trivedi (1993). Ali & Ripley (1987) mentioned that the peafowl is neither a communal nor a solitary rooster. In the present study, peafowl were found to roost alone as well as in flocks. It is apparent that the selection of a roosting tree acts as an anti-predatory strategy. Most of the roosting trees in Anaikatty Hills were located in SACON campus, with a few on the forest's edge, and in open barren land. In open lands, peafowl mainly roosted on tamarind trees, probably due to their dense foliage, and proximity to agricultural fields.

Habitat use and predators: In Anaikatty Hills, peafowl spent a major proportion of their time (45%) in the scrub jungle. Other habitats such as mixed dry deciduous forests, open barren land, and agricultural field were scarcely used. Similar observations were reported by Sathyanarayana (2000) who opined that Scrub jungle provides perfect camouflage, better concealment, and protection from predators, and serves as a rich food source. During human interventions, birds hid inside the bush. In Anaikatty Hills, roaming stray dogs were recorded as the major predator for peafowl. Johnsingh & Murali (1980) recorded predation of male peafowl by village dogs in a forest plantation. Sharma (1979) also reported dogs as prime predators for peafowl.

From this study it is inferred that the peafowl is an omnivore that relies mainly on vegetable matter; prefers tall trees with dense foliage, or thorny trees for roosting; and prefers open scrub vegetation for foraging. Stray dogs seem to be the major predator for peafowl.

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Appendix 1. List of food items consumed by The Indian Peafowl in Anaikatty Hills

S.No	Food Item	Part(s) used
Vegetable matter		
1	<i>Croton bonplandianum</i>	leaves, shoots, seeds
2	<i>Opuntia dillenni</i>	fruits
3	<i>Parthenium hysterophorus</i>	buds, seeds
4	<i>Lantana camara</i>	fruits
5	<i>Leucas aspera</i>	leaves, shoots, flowers
6	<i>Cassia occidentalis</i>	flowers
7	<i>Aerva lanata</i>	buds
8	<i>Achras sapota</i>	fruits
9	<i>Solanum nigrum</i>	leaves, shoots, fruits
10	<i>Cynodon dactylon</i>	leaves, shoots
11	<i>Abutilon crispum</i>	seeds
12	<i>Clausena dentata</i>	shoots
13	<i>Alternanthera sessilis</i>	leaves, shoots, buds
14	<i>Datura metel</i>	seeds
15	<i>Ziziphus oenaplia</i>	fruits
16	<i>Vicoa indica</i>	shoots, flowers
17	<i>Santalum album</i>	fruits
18	<i>Abutilon indicum</i>	seeds
19	<i>Eleusine coracana</i>	seeds
20	<i>Dolichos lablab</i>	seeds
21	<i>Amaranthus sp</i>	leaves, shoots, seeds
22	<i>Capsicum annum</i>	fruits, seeds
23	<i>Solanum sp</i>	seeds
24	<i>Sida acuta</i>	seeds
25	<i>Argemone mexicana</i>	flowers
26	<i>Calotropis gigantea</i>	buds
27	<i>Crotalaria sp</i>	seeds
28	<i>Tephrosia purpurea</i>	seeds
29	<i>Maytenus emarginata</i>	fruits
30	<i>Pavonia odorata</i>	fruits
31	<i>Ocimum sanctum</i>	shoots
Animal matter		
1	Ants	
2	Termites	
3	Grasshopper	
4	Spider	
5	Beetle	
6	Earthworm	
7	Bones (unidentified)	

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