

## Population status and distribution pattern of Indian Blue Peafowl (*Pavo cristatus* L.) in Thuraiyur area of Trichy District, Tamilnadu, Southern India.

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### Abstract

Population status and distribution pattern of Indian Blue Peafowl (*Pavo cristatus*) was studied in 12 different villages of Thuraiyur area during March 2013 to August 2013. Maximum population of peafowl was recorded in Maniyampatti 21.67±8.58 (12.74%) followed by T. Kalathur 20.33±3.16 (11.95%) and Peramangalam 20.17±4.07 (11.85%) villages. Minimum population of peafowl was recorded in Karattampatti 08.50±3.39 (5.00%) and Karuppu Kovil 07.33±2.25 (4.31%) villages. Month wise maximum population was recorded in the month of April (18.61%; N= 190) followed by May (18.51%; N= 189). On the other hand, minimum population was observed in July (13.91%; N 142). Monthly variation in the population was also found statistically significant ( $H_{11} = df = 5, P 1.535, P < 0.05$ ). The adult male and adult female sex ratio was 1:1.2. Six roost tree species were selected by the peafowl for night roosting purposes. The frequency of different roost sites varied significantly among different roost sites ( $\chi^2 = 5.15, df 5, P < 0.05$ ). The roosting tree height was ranged from 13 to 40 feet and the roost height varied between 16 and 35 feet. The roosting time of the peafowl was ranged between 17.33 and 19.10 h. Most of the adult males roosted alone or together with one or two adult males. The height of these roosting trees varied from 12-15m. In all the villages peafowl preferred to roost primarily on tall trees (>12m) with thick branches. Peafowl mostly roosted on trees with dense foliage such as *Ficus benghalensis*, *Tamarindus indicus*, *Madhuca indica*, *Cocus nucifera*, Palm tree and *Acacia* Sp. And preferred the highest tree branches.

**Key words:** Indian Blue peafowl, Population, *Pavo cristatus*, Thuraiyur, Tamilnadu

### INTRODUCTION

Generally, peafowl is considered as an indicator species. Indian Blue Peafowl (*Pavo cristatus*) is belonged to the family Phasianidae of the order Galliformes. There are two species namely *Pavo cristatus* and *P. muticus*, recorded in southern and South East Asia. *P. cristatus* (Indian Blue Peafowl) has been reported from India and Sri Lanka, whereas *P. muticus* (Green Peafowl) has been recorded from Bangladesh, Burma and South East Asia. The geographical ranges of these two species generally do not overlap. However, the distribution range of *P. muticus* extends upto 1500 to 1800 m., whereas *P. cristatus* is restricted to low plains, frequently less than 600 m. (Baker, 1930).

It is the National bird and is given special protection as it is included in Schedule I of the Indian Wildlife Protection Act 1972. Nevertheless, the population of the bird is decreasing in India. It has also been reported that there is no reliable estimate of the population of peafowl available in India (Ali and Ripley, 1987; Choudhury and Sathyakumar, 2007).

Trivedi and Johnsingh (1996) reported that the roost of Indian Blue Peafowl gives us lot of management strategies to safe guard the trees in the relevant habitats. But information on the roost selection is a vital component in the overall habitat selection process. However, no information is available on the roost study

of Indian Blue Peafowl in Thuraiyur area. Hence the roost and roosting behavior of this species were also studied, and this paper deals with population status and the roosting behavior of the peafowl in the Thuraiyur area of Tiruchirappalli district of Tamilnadu.

### STUDY AREA

The study was carried out in 12 different villages around Thuraiyur area (N11° 03.845'; E078° 41.007') viz., Gandhi Nagar, Kezha Naduvalur, Muthaiyampalayam, Peramangalam, Maniyampatti, Salapatti, Thiruvallarai, T. Kalathur, Thenur, Edhumalai, Karattampatti and Karuppu Kovil (Plate I) from March 2013 to August 2013. The study area is criss crossed by number of metal and mud roads. The only water source is rainfall. There was no perennial or non-perennial rivers flow through the study area. People in this area depend more upon the agricultural activities. Farmers plant paddy, banana, coconut, ground nut, sugar cane, sunflower, cereals, pulses, etc., They use number of pesticides and insecticides for their crops against insect pest attack. People cut the trees as fire wood in some of the areas. This leads to lack of roost trees for the peafowl. The villagers pump out water through motor for their agricultural activities. Topography of the area is mostly flat except for a few knolls. The temperature ranged from 30.0°C to 39.0°C during summer, and 20°C to 26°C during the monsoon and post monsoon periods. The study area receives northeast (October-December) monsoon rains. Failure of monsoon occurs rarely and results in drought.

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## MATERIALS AND METHODS

### Population status and distribution pattern of Peafowl

The population status of the Indian Blue Peafowl was determined by Trail walks method as suggested by Gaston (1980). Walking was made on ridges, roads, different agricultural habitats and ploughed open dry areas at a maximum visible distance (approx. 100 – 150 mts). The population of peafowl was recorded both in the morning and evening. The survey was carried out immediately after sun rise in the morning and normally from 06.00 to 09.00 AM. with normal speed of walk (0.75 to 1.00 km/h.). The evening survey was carried out normally from 16.00 to 18.00 h. with normal speed of walk (0.75 to 1.00 km/h.). The survey was carried out once in a month. On every walk, birds sighted, number of peafowl, group size, sex, habitat, date, time and perpendicular distance were recorded. A group of birds was considered as a flock. No census was done on days with heavy rain or bad weather.

### Description of Census Trails

Trial walks of totally 30 km were made. The metal roads, human foot path, mud roads were used for the census. The important vegetation was patches of *Prosopis* shrub and agricultural field. The *Prosopis* weed borders the agricultural fields in the study area. There are villages/settlements surroundings this area with patches of cultivation. The trails were varying in length from 2.7 to 1 km. The trail was made 4 times for each one. All trails were made in the morning and evening, and the calls and sightings of peafowl were recorded. All observations were made from the distance of about 50 meters with the help of a powerful 10x50 and 8x32.5 binocular (Olympus, China made).

### Roost

Further the presence of peafowl roosting was enquired with local farmers and other local people to get information on roost and roost tree selection by Indian Blue Peafowl. In the present study area both direct and indirect methods were used to locate and identify the roost trees. The direct method involved walking along the study areas during late evening or early morning to flush the roosting birds and locate the trees. The indirect method involved searching for droppings below potential roost trees to identify actual roost trees. The peafowl roosting trees (sites) were searched intensively in different habitats on foot and recorded as described by Sharma (1978). All observations were made from the distance of about 50 meters with the help of a powerful 10x50 and 8x32.5 binocular. The distance between the roost sites and the foraging grounds were measured with the help of rope. The tree species used by peafowl for roosting were identified (Matthew, 1982) and recorded. The roost

trees were marked with paint. The roosting behaviour of peafowl was also observed. Details such as roost tree (n), roost tree height (m), roost height (m), tree gbh (cm), habitat, date, time, number of days spent on each tree, and distance between different roost trees (m) were recorded.

### Statistical Analysis

ANOVA and Chi-Square analysis (Mean and SD), wherever appropriate, were carried out (Sokal and Rohlf, 1981). Kruskal-Wallis one-way ANOVA was tested to know the differentiation of peafowl population among months and between months. Results are reported as significant if they are associated with a value of  $P < 0.05$ . Graphical representation of data has been done using Microsoft Office excel 2007 version. To assess the difference among the utilization of different trees for roosting, the results were subjected to Chi-Square analysis. The SPSS (Nouris, 1999) version 13 software was used for data analysis.

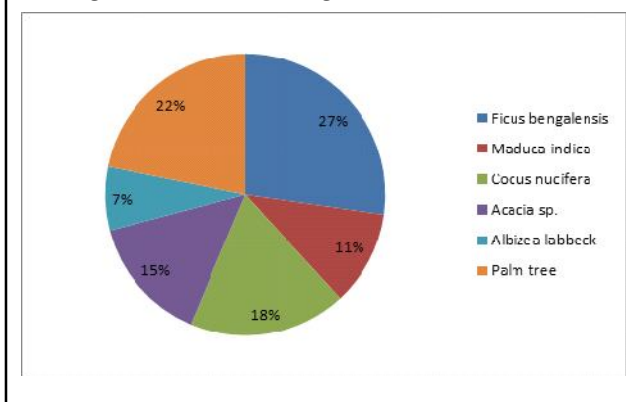
## RESULTS AND DISCUSSION

### Overall Population

The overall population of Indian Blue Peafowl from March 2013 to August 2013 showed maximum in Maniyampatti  $21.67 \pm 8.58$  (12.74%) followed by T. Kalathur  $20.33 \pm 3.16$  (11.95) and Peramangalam  $20.17 \pm 4.07$  (11.85) (Table 1). On the other hand, minimum was recorded in Karattampatti  $08.50 \pm 3.39$  (5.00%) and Karuppu Kovil  $07.33 \pm 2.25$  (4.31%) villages (Table 1). Probably, the increase in number could be due to the presence of dense vegetation or less predator pressure would have caused in certain areas. Rarely local villagers banished the peafowl from their crop fields to protect their crops against foraging and damaging. The same attitude of the villagers has also been reported previously (Priya, 2009 ; Meenatchi, 2011; Dhamodharan, 2012). Gaston (1980) emphasized the absolute count method is the simplest method to get an index of pheasant population and can be carried out at any time of the year. Further, it is found to be the reliable method for estimating abundance of particular bird species which are surviving in the open or semi arid areas.

In the present study the male and female sex ratio was 1:1.2. Male to female sex ratio of peafowl was estimated as 1:1.44, which is more or less similar to the sex ratio reported from other parts of northern India, which was 1:1.24 (admitted that, they might have been mistaken for Sharma, 1978). Johnsingh and Murali (1980) reported a sex ratio that favoured apparent females, and suggested that the female young individuals could have been considered for males in the estimate and that could have caused the bias. It is also suggested that only half of the females in a given population are

Fig 1. Tree species preferred for roosting by Indian Blue Peafowl (*Pavo cristatus*) in Thuraiyur area during March 2013 to August 2013.



actually breeding birds, as some are too young and others are too old or otherwise unable to breed (Sharma, 1978).

### Monthly variation in the Populations

Monthly variation in the population of Indian Blue peafowl is presented in Table 2. Maximum population was recorded in the month of April 2013 (18.61%; N=190) followed by May 2013 (18.51%; N=189). On the other hand, the minimum population was observed in July 2013 (13.91%; N=142). However, monthly variation was statistically significant ( $H_{11} = df = 5, P = 1.535, P < 0.05$  Kruskal-Wallis one-way ANOVA-test). During the summer (April) most of the vegetations were dried up and the peafowl almost completed their breeding and hence they were forced to forage in the open places, which could be the reason for the higher number of peafowl during summer. Further, the predation pressure and local people disturbances could cause the peafowl to concentrate in a particular area for foraging. Generally the peafowls were observed and recorded from the agricultural fields and also from the areas inhabited with *Prosopis*. It is because by the fact that the shrubby *Prosopis* provided shade and the agricultural fields are the source of their feed.

Adult males (24.68%; N=252), adult females (25.37%; N=259), sub adult males (23.80%; N=243) and sub adult females (26.15%; N=267) were recorded from the study area (Table 2). It was also found that the highest number of population was recorded during April 2013. Age and sex composition of the adult male (23.16%; N=44), adult female (28.42%; N=54), sub adult male (26.32%; N=50) and sub adult female (22.11%; N=42) showed variation. The lowest number of population was recorded during July 2013 and the age and sex composition recorded was as follows: adult male (19.72%; N=28), adult female (23.94%; N=34), sub adult male (31.69%; N=45) and sub adult female (24.65%; N=35). Begon and Mortimer (1986) attributed predation, intra and interspecific

resource competition, parasites and diseases, habitat availability and weather as the factors influencing the yearly variations in bird densities. Human induced disturbances as observed in the present study might be the reasons for the monthly variations in the population of Indian Blue Peafowl. More reports are available on seasonal variations in avian species composition and abundance (Lack, 1954; Leck, 1972; Winternitz, 1976; Gaston, 1978; Martin, 1980). Johnsingh and Murali (1980) studied around the hamlet of Injar in Tamilnadu and found that there were about 100 peafowls in a population. These birds foraged in an area of about 100 ha, which included cultivated land, an area of fallow land and an area inhabited with *Acacia sp.*, of unknown extent. Thus, the density of the population assumed to be less than one bird per hectare, which is in accordance with the present estimate of the population density at Thuraiyur area.

### Roost of Peafowl:

In the present study, roost of peafowl was recorded from Abinimangalam, Sathanur, Naduvalur, Muthaiyampalayam, Omanthur, Thenur, Kannappadi, T.Kalathur, Kottathur, Gandhi Nagar, Sirugudi, Veerani, Seerupathur, Puthanampatti and Vellakalpatti. Totally 55 birds were found roosted on 15 trees. It was also observed that six roost tree species were selected by the peafowl for night roosting purposes. They include *Ficus bengalensis* (27.27%, number of birds=15 in 3 trees), *Madhuca indica* (10.91%, number of birds=06 in 1 tree), *Cocus nucifera* (18.18%, number of birds=10 in 5 trees), *Acacia sp.* (14.55%, number of birds=08 in 2 trees), *Albizzia lebbbeck* (7.27%, number of birds=4 in 2 trees) and Palm tree (21.82%, number of birds=12 in 2 trees) (Table 3, Fig1). The frequency of different roost site varied significantly among different roost sites ( $\chi^2 = 5.15, df = 5, P < 0.05$ ). However, the peafowls mostly roosted on tall trees. According to Baker and Inglis (1930) peafowls preferably roost on high, open trees so that they could get vision from all directions; and they generally select the tallest trees for roosting in forests in order to protect themselves from the tree-climbing, night predators such as the leopard and other cats. Johnsingh and Murali (1980) found five banyan trees (*Ficus bengalensis*) served as the roosting site for about 100 birds. However, such mass roosting in trees were seldom observed in the present study and the maximum number observed to roost in any one tree was 15 and minimum was 06. It has been reported that in such mass roosting they break up into small groups in the morning with a male and harem of three to five females (Ali and Ripley, 1978). After leaving the roosting areas the birds move into forest clearings, cultivated fields, or other areas for foraging in the early morning hours. In the mid day they spent their time

**Table 1. Population status of Indian Blue Peafowl (*Pavo cristatus*) in different villages of Thuraiyur area during March to August 2013**

S.No	Village Name	March 2013		April 2013		May 2013		June 2013		July 2013		August 2013		Overall	
		Total (n)	%	Total (n)	%	Total (n)	%	Total (n)	%	Total (n)	%	Total (n)	%	Mean ±SD	%
1	Gandhi Nagar	13	7.18	12	6.35	11	5.79	08	5.00	10	7.04	14	8.81	11.33±2.16	6.66
2	Kezha Naduvallur	19	10.50	17	8.99	15	7.89	12	7.50	08	5.63	24	15.09	15.83±5.56	9.30
3	Muthaiyampalayam	13	7.18	13	6.88	14	7.37	14	8.75	14	9.86	11	6.92	13.17±1.17	7.74
4	Perarungalan	24	13.25	25	13.23	21	11.05	16	10.00	15	10.56	20	12.58	20.17±4.07	11.85
5	Manivampatt.	37	20.44	27	14.29	18	9.47	16	10.00	13	9.15	19	11.95	21.67±8.58	12.74
6	Salapatri	16	8.84	16	8.47	16	8.42	12	7.50	08	5.63	12	7.55	13.33±3.27	7.83
7	Thiruvallurai	05	2.76	08	4.23	16	8.42	15	9.38	14	9.86	05	3.14	10.50±5.09	6.17
8	T. Kakathur	16	8.84	25	13.23	24	12.63	20	12.50	20	14.08	17	10.69	20.33±3.16	11.95
9	Thearir	13	7.18	13	6.88	18	9.47	15	9.38	14	9.86	16	10.06	14.83±1.94	8.72
10	Ethumalai	12	6.63	13	6.88	16	8.42	13	8.13	13	9.15	12	7.55	13.17±1.47	7.74
11	Karatampatti	04	2.21	11	5.82	13	6.84	12	7.50	05	3.52	06	3.77	08.50±3.39	5.00
12	Karuppu Kovil	09	4.97	09	4.76	08	4.21	07	4.38	08	5.63	03	1.89	07.33±2.25	4.31
	<b>Total</b>	<b>181</b>	<b>100</b>	<b>189</b>	<b>100</b>	<b>190</b>	<b>100</b>	<b>160</b>	<b>100</b>	<b>142</b>	<b>100</b>	<b>159</b>	<b>100</b>	<b>170.17±19.43</b>	<b>100</b>
	<b>Percentage</b>	<b>17.73</b>		<b>18.51</b>		<b>18.61</b>		<b>15.67</b>		<b>13.91</b>		<b>15.57</b>			

n=number of peafowl recorded

**Table 2. Month wise population of Indian Blue Peafowl in Thuraiyur area during March 2013 to August 2013**

S.No	Month	Adult Male(n)	Adult Female(n)	Sub adult Male(n)	Sub adult Female(n)	Chicks (n)	Total (n)	%
1	March	48	45	41	47	0	181	17.73
2	April	51	48	40	50	0	189	18.51
3	May	44	54	50	42	0	190	18.61
4	June	36	40	45	39	0	160	15.67
5	July	28	34	45	35	0	142	13.91
6	August	45	38	22	54	0	159	15.57
	<b>Total</b>	<b>252</b>	<b>259</b>	<b>243</b>	<b>267</b>	<b>0</b>	<b>1021</b>	
	<b>Percentage</b>	<b>24.68</b>	<b>25.37</b>	<b>23.80</b>	<b>26.15</b>	<b>0</b>	<b>100</b>	

n=number of peafowl recorded

**Table 3. Tree species preferred for roosting by Indian Blue Peafowl (*Pavo cristatus*) in Thuraiyur area during March 2013 to August 2013.**

S.No	Tree species	Numberof Trees	Numberof Birds	Percentage
1	<i>Ficus bengalensis</i>	3	15	27.27
2	<i>Madhuca indica</i>	1	06	10.91
3	<i>Cocus nucifera</i>	5	10	18.18
4	<i>Acacia sp.</i>	2	08	14.55
5	<i>Albizia lebbbeck</i>	2	04	7.27
6	Palm tree	2	12	21.82
	<b>Total</b>	<b>15</b>	<b>55</b>	<b>100%</b>

under shady trees often very close to the water sources, where the birds drink and preen at length. Late in the afternoon, they forage a second time, and return for another drink at dusk before going to roost in the evening (Ali and Ripley, 1978).

In the present investigation, the peafowls were observed to roost on tall trees of different species. The selection of *Ficus bengalensis*, *Madhuca indica*, *Cocos nucifera*, *Acacia sp.* *Albizia lebbek* and Palm tree could be attributed to the fact that the roost trees provide refuge against predator and weather. Apart from that the nearby areas provide necessary feed and water facilities to the peafowl. It was also found that the roost tree height was in the range of 13 to 40 feet. The peafowl preferred the primary and secondary branches for roosting. It was also observed that the permanent roosting time between 17.33 and 19.10 h. In the pre roost and post roost areas the peafowl vocalized. The peafowl were noticed departed from the roost at 06.16 to 06.42 am just before sunrise. The peafowls dispersed from the roost tree and took the post roost activities. Some peafowl were observed directly reached the foraging grounds either as solitary ones or in groups.

Roosting site selection plays a pivotal role in the nesting success of any species. Judicious selection of the roosting site enhances the survival of birds, by virtue of reduced heat loss, information sharing, accountability of population and better protection from predators (Gadgil 1972 ;Tast and Rassi 1973, Gadgil and Ali 1975 ; Gyllin *et al.*, 1977). The Indian Blue Peafowl, is known to roost on trees and large buildings at night. Through there are reports on the roosting behavior of peafowl, detailed studies on the roost site selection have been reported by Trivedi and Johnsingh in 1996 from Gir forest. They established that the peafowl generally preferred tall trees.. The Leopard, *Panthera pardus*, is an important predator of peafowl in Gir forest. Preference to tall trees for roosting has been attributed shelter and protection provided by such trees against from the ground predator.

### Roosting

In the present study most of the adult males roosted alone or together with one or two adult males. They were found to roost with females and sub-adult males in small groups on the same tree. Majority of the peahens roosted together in small groups of 3-4 along with sub-adult males. The height of these roosting trees varied from 12-15m. In all the villages peafowl preferred to roost primarily on tall trees (>12m) with thick branches. Whenever peafowl roosted on trees with dense foliage such as *Ficus benghalensis*, *Tamarindus, indicus*, *Madhuca indica*, *Cocos nucifera*, Palm tree and *Acacia sp.* peafowl preferred the highest branches. They roosted on lower branches also. On leafy trees having

several thick branches, the peafowl first rested on a lower branch and then moved to the final roosting site. Ramesh and Sathyanarayana (2002) reported that the canopy cover and thorny nature of trees are preferred by Grey Jungle fowl at Srivilliputtur Grizzled Giant Squirrel Wildlife Sanctuary. In the present study the Peafowl roosting tree height varied between 17 to 70 feet and the roosting height ranged from 15 to 45 feet. These results are in accordance with the results of Priya (2009) and Meenatchi (2011). Subramanian *et al.* (2001) have stated that certain tree species possess the necessary structural features of an ideal roost tree and the height of the roost tree and the canopy cover might have played a role in choosing the roost trees by Gallinaceous species. Zacharias (1997) observed that the Peafowl roosted on small trees, such as *Acacia*, often encircled by climbers, at a height of about 20-25 feet, when going to roost the birds fly to the lower branches and then move up to the upper branches by jumping. Johnson (1963) observed the Red Jungle fowl in Thailand roosted in the overlapping bamboo clumps 10 to 30 feet apart. Trivedi and Johnsingh (1996) opined that the preference for the roost trees is an antipredatory strategy against nocturnal predators. These authors further stated that any tree which satisfies the structural requirements for avoiding predators may be preferred by birds for roosting. Only those tree species possess the necessary structural features of an ideal roost tree are preferred. Lack (1954) and Hill and Robertson (1988) stated that the predation is common in Gallinaceous birds. The height of roost tree, roost height, canopy cover and habitat plays a vital role in choosing the roost trees by Peafowl. Roosting site may enhance the survival of birds, by virtue of reduced heat loss, information sharing and better protection from predators (Gadgil and Ali, 1975). Priya (2009) and Meenatchi (2011) emphasized that the tall trees give maximum protection for the ost of the galliformes species. In their findings the *Cocos nucifera* and *Albizia amara* were the preferred roost trees. In the present investigation also the same species were found as the most preferred trees for night roosting. In Thuraiyur area the jungle cat (*Felis chaus*), jackal (*Canis aureus*), python (*Python molurus*) and Common Indian Monitor Lizard (*Varanus bengalensis*) were the common predators.

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