

Research Article

**POPULATION STATUS AND CONSERVATION THREATS OF INDIAN PEAFOWL  
(*PAVO CRISTATUS LINNAEUS*, 1758) IN KARUR DISTRICT OF TAMIL NADU,  
SOUTHERN INDIA**

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**ABSTRACT**

The present study aimed to assess the population dynamic and threats faced by the peafowl in Karur district, Tamil Nadu from September 2017 to February 2018. In 576 sighting, about 1356 individual Indian peafowl were recorded between 600 km with an encounter rate (ER) of 2.26 ( $5.89 \pm 0.05$ ) individuals/Km with a total density of 27.12 individual per kilometer square, in which Thumbivadi village has a total of 481 individuals of peafowls were recorded in 207 sightings in 240 km ( $5.06 \pm 0.03$ , ER=2.00 individuals/km) and Thennilai Village (20 km<sup>2</sup>) possessing a total of 317 individuals of peafowl were recorded in 156 sightings in 180 km ( $7.03 \pm 0.03$ , ER=1.76 individuals/km) and in Mayanur Village (10 km<sup>2</sup>), a total of 558 individuals of peafowl were recorded in 213 sightings in 180 km ( $7.24 \pm 0.09$ , ER=3.10 individuals/km) is recorded. Also, the roosting tree and the bio-controller used is listed below.

**Keywords:** Agricultural, India, Population, Peafowl, Tamil Nadu.

**INTRODUCTION**

The Indian peafowl (*Pavo cristatus Linnaeus*, 1758) is also known as the blue peafowl. In 1963, the Indian peafowl is declared as the national bird of India because of its flagship value found in our theology and splendor and it is placed in schedule-I of the Indian wildlife (protection) act, 1972. International Union for Conservation of Nature (birdlife international, 2016) describes the bird as the Least Concerned (LC). This pheasant group of birds belongs to the family Phasianidae of the order Galliformes which includes pheasants, partridges, and quails, where all of them are commonly known as the game bird. Birds are widely recognized as a good indicator of the quality of the ecosystems and a healthy environment (Gill et al. 1994), (McGowan et al. 1995) considered the pheasants as forest biodiversity indicators. The Indian peafowl is polygamous and generally has three breeding peahens in its harness (Roberts et al. 1991). The Indian peafowl is omnivorous, they feed on seed, fruit, insects, amphibians, reptile, small mammals (Panda et al. 2016) (Johnsingh et al. 1976). Around cultivation areas, the peafowl feeds on a variety of crops such as groundnut (*Arachis hypogaea L*), tomato (*Solanum melongena L.*), Paddy (*Oryza spp.*), red chili (*capsicum annum L.*), and even bananas (*Musa sp.*) (Johnsingh et al. 1978). The Indian peafowl is regionally found around dry deciduous, moist deciduous, semi-arid regions, near agricultural fields, and water sources. The population of the Indian peafowl is on the decline and the bird has become locally extinct in some areas of its past distribution range, numerous threats to its existing population include habitat loss and degradation, human population pressure, illegal poaching, intensive agricultural practice and

use of pesticides, retaliatory killing, the collection of eggs for consumption and killing for medicinal purposes (Anwar et al. 2015). In Pakistan, the peafowl has been extirpated from many parts of its former range due to trapping and illegal poaching of this beautiful bird (Anwar et al. 2015). Even though there is a healthy population of peafowl in different parts of the country, especially in Karur Tamil Nadu, there is no such studies have been done on their population status, ecology, and the threats they face. So, the status of the peafowl population of this area is poorly known. This present study aimed to estimate the population status, utilization of agriculture field, and threats faced by Indian peafowl in Karur, Tamil Nadu from September 2017 to February 2018. The result of this study would provide baseline information for developing management and conservation strategies for the Indian peafowl.

**MATERIALS AND METHODS**

**Study area**

Karur district is located centrally along the Kaveri and Amaravathi rivers in Tamilnadu, India. The main town in Karur district is the city of Karur. It is the centrally located district of Tamilnadu. It is bounded by Namakkal district in the north, Dindigul district in the south, Thiruchirappalli district on the east and Erode district on the west. It has an area of 2896 sq. km. The utilization of land area in Karur district is up to 44.59%. 4.76% of the land area remains as other uncultivated lands. 2.74% is forest area in Karur district. Black soil is the predominant soil type in this district accounting for 35.51%. Karur is famous for its textile value and other side agriculture also been done. The main crops cultivated are paddy, banana,

sugarcane, battle leaf, grams & pulses, tapioca, kora grass, groundnuts, oilseeds, tropical vegetables, and medicinal herbs.

### Population estimation

Line transects were laid in three different areas and a motor vehicle was used in the early morning (06.00 to 10.00) and late evening (03.00 to 07.00) to study the abundance and density of the peafowl in the study area. A total of 50 km of transects were laid near Thumbivadi village (20 km), Thennilai village (15 km), Mayanur village (15 km) as per stratified sampling techniques in proportion to the availability of each land in the study area. The transect was covered two times each month. On each sighting of the peafowl variables such as the total number of individuals like an adult male, adult female, sub-adult male, sub-adult female and chicks, group size, crop cultivation, and the roosting tree was recorded.

### Sex identification

The sexual dimorphism between both sexes is effortlessly observable. Peacocks are a larger-sized bird with a length of the bill to tail as much as 225 cm. The male peacock has a metallic blue colored feather on the crown and The feathers of the head being short and curled. The body has bronze-green feathers with black and copper marking which are followed by the covert feather. The tail is dark brown colored, the "train" of the peacock is made up of elongated upper tail coverts nearly all of these feathers (approx 200 feathers) end with an elaborate eye-spot. On the other side, peahens possess short tails with dull brownish-grey feathers and They are smaller in size which is around 95 cm in length. Though both of them have white markings on the upper and lower sides of their eyes, this feature is more observable in males. In peahens, the crest has brownish feathers. It looks like the neck is covered with scales in females but the male peacock has blue neck feathers that look like fur. In male peacocks, the wings can either be barred or solid in color, whereas peahens usually have solid brown wings. The sexual dimorphism between both sexes is effortlessly observable. And they also differ in their legs. Male peacocks have slightly longer legs than females. Though both sexes have spurs or thorns on their legs, it can be found earlier in males. These spurs are much shorter and blunt in females. They use it during territorial fights.

### Roosting tree

The Indian peafowl roosting sites and trees were searched and noted directly at dawn and dusk. The peafowl roosting tree was confirmed by seeing with the help of powerful Binocular (10 × 50 OLYMPUS, Olympus Europe SE and Co. KG, Hamburg). Details of the roosted tree (n), roosted tree height (m), roosted height (m), tree diameter at breast height (cm), date, time were recorded and, in some cases, the dropping under the tree proves that the tree is regularly used by peacock for roosting. The roost tree species were identified and recorded by following (Matthew et al. 1982).

### People perception

The study was targeted at landowners (n=30) and dairy farmers (n=20). For this study, two sets of questionnaires were developed are Precise and Closed and the other one was Broad and Open-ended. Face-to-face interviews were made to clear any doubt about the questions. This way made people easier to interact with us. Information was collected through "Broad and Open-ended" questions allowing the respondent to express his views freely without any embarrassment (Samson et al. 2020).

### Statistical treatment

Encounter Rate was performed with several individuals recorded per km in the study area. Mean (M) and Standard Error (SE) were calculated for the sighting of individuals and Statistical analysis was performed by using computer software (Past 3.11).

### RESULTS

In total 576 sightings, about 1356 individuals of Indian peafowl were recorded between 600 km with an encounter rate (ER) of 2.26 ( $5.89 \pm 0.05$ ) individuals/Km with a total density of 27.12 individuals per kilometer square and Relative density of 99.999 in Karur, Tamil Nadu. Of this sequence, Adult Female was accounted more in number (n=601 ( $2.61 \pm 0.04$ ), ER 1.00/km), followed by Sub-Adult female (n=252 ( $1.09 \pm 0.06$ ), ER=0.42), Adult male (n=328 ( $1.09 \pm 0.06$ ), ER=0.54), Sub-Adult male (n=160 ( $0.69 \pm 0.08$ ), ER=0.26) and Juvenile (n=15 ( $0.06 \pm 0.09$ ), ER=0.02). The sex ratio between male and female is 1:1.74 followed by Adult males and Adult female is 1:1.83 and the sub-adult male and sub-adult female were 1:1.57 (Table 1).

**Table 1:** Population Status and Demography of the Indian Peafowl in Karur District, Tamil Nadu.

S.No	Demography	Sighting	Individual	M ± SE	ER/Km
1	Adult Male	162	328	$1.42 \pm 0.07$	0.54
2	Adult Female	203	601	$2.61 \pm 0.04$	1.00
3	Sub-Adult Male	90	160	$0.69 \pm 0.08$	0.26
4	Sub-Adult Female	112	252	$1.09 \pm 0.06$	0.42
5	Juveniles	9	15	$0.06 \pm 0.09$	0.02
Total		1356	$5.89 \pm 0.05$	2.26	6.84

In Thumbivadi village a total of 481 individuals of peafowls were recorded in 207 sightings in 240 km ( $5.06 \pm 0.03$ , ER=2.00 individuals/km and Density=22.90 individual/km<sup>2</sup>). Of which Adult Females were accounted more numbers (n=200 ( $2.10 \pm 0.07$ ) E=0.83 individuals/km) followed by Adult male (n=122 ( $1.28 \pm 0.08$ ), ER=0.50 individuals/km), Sub-Adult female (n=98 ( $1.0 \pm 0.08$ ) ER=0.40 individuals/km), Sub-Adult male (n=55 ( $0.57 \pm 0.01$ ) ER=0.22 individuals/km) and juveniles (n=6 ( $2.00 \pm 0.01$ ), ER=0.02 individuals/km). The sex ratio shows that overall males and females 1:1.68 of which adult male and female sex ratio were 1:1.63 and sub adult males and females 1:1.78 (Table 2).

**Table 2:** Population Status and Demography of the Indian Peafowl in Thumbivadi village, Karur.

S.No	Demography	Sighting	Individual	M ± SE	ER/Km
1	Adult Male	58	122	1.28 ± 0.08	0.50
2	Adult Female	71	200	2.10 ± 0.07	0.83
3	Sub-Adult Male	36	55	0.57 ± 0.01	0.22
4	Sub-Adult Female	39	98	1.03 ± 0.08	0.40
5	Juveniles	3	6	2.00 ± 0.01	0.02
Total		207	481	5.06 ± 0.03	2.00

In Thennilai Village (20 km<sup>2</sup>), a total of 317 individuals of peafowl were recorded in 156 sightings in 180 km (7.03 ± 0.03, ER=1.76 individuals/km) And has a Density of 21.13 and Relative Density of 26.01. Of which Adult Females were accounted more numbers (n=160 (3.62 ± 0.02) ER=0.88 individuals/km) followed by Adult male (n=72 (1.5 ± 0.05), ER=0.40 individuals/km), Sub-Adult female (n=48(0.82 ± 0.08) ER=0.26 individuals/km), Sub-Adult male (n=29(0.50 ± 0.01) ER=0.16 individuals/km) and juveniles (n=8 (0.13 ± 0.03), ER=0.04 individuals/km). The sex ratio shows that overall males and females 1:2.05 of which adult male and female sex ratio were 1:2.22 and sub adult males and females 1:1.65 (Table 3).

**Table 3:** Population Status and Demography of the Indian Peafowl in Thenillai village, Karur.

S.No	Demography	Sighting	Individual	M ± SE	ER/Km
1	Adult Male	41	72	1.05±0.05	0.40
2	Adult Female	57	160	3.62 ± 0.02	0.88
3	Sub-Adult Male	21	29	0.50 ± 0.01	0.16
4	Sub-Adult Female	32	48	0.82 ± 0.08	0.26
5	Juveniles	5	8	0.13 ± 0.03	0.04
Total		156	317	7.03 ± 0.03	1.76

In Mayanur Village (10 km<sup>2</sup>), a total of 558 individuals of peafowl were recorded in 213 sightings in 180 km (7.24±0.09, ER=3.10 individuals/km) And has a Density of 37.2 and Relative Density of 45.79. Of which Adult Females were accounted more numbers (n=241 (3.12± 0.06) ER=1.33 individuals/km) followed by Adult male (n=134 (1.74 ± 0.10), ER 0.74 individuals/km), Sub-Adult female (n=106(1.37±0.01) ER=0.58 individuals/km), Sub-Adult male (n=76(0.98± 0.04) ER=0.42 individuals/km) and juveniles (n=1 (0.01 ± 0.01), ER=0.00 individuals/km). The sex ratio shows that overall males and females 1:1.65 of which adult male and female sex ratio were 1:1.79 and sub adult males and females 1:2.10 (Table 4).

**Table 4:** Population Status and Demography of the Indian Peafowl in Mayanur village, Karur.

S.No	Demography	Sighting	Individual	M ± SE	ER/Km
1	Adult Male	63	134	1.74 ± 0.10	0.74
2	Adult Female	75	241	3.12 ± 0.06	1.33

3	Sub-Adult Male	33	76	0.98 ± 0.04	0.42
4	Sub-Adult Female	41	106	1.37 ± 0.01	0.58
5	Juveniles	1	1	0.01 ± 0.01	0.00
Total		213	558	7.24 ± 0.09	3.10

The group size result shows that the mayanur village has a greater number of individuals in the group such as a minimum individual as 1 and a maximal individual in a group as 33.

About 14 Roosting tree species were recorded during the survey, of which *Tamarindus indica* L.(n=11) were used dominantly by peafowl and the average roosting height was 7.69 m. Which was followed by *Tectona grandis* L.f. (n=8) with an average roosting height of 9.14 m, followed by *Thespesia populnea* (L.) Sol. (n=7) with an average height of 4.55 and four tree species recorded the least in number (n=1) they are *Syzygium cumini* (L.) Skeels with the roosting height of 10.57, *Ricinus communis* L. with the roosting height of 0.96, *Prunus dulcis* (Mill.) D. A. Webb with the roosting height of 4.94, *Albizia saman* F. Muell. with the height of 10.6. From Above, the average roosting height of Indian peafowl is founded as 3.78 m (Table 5).

**Table 5:** Roosting Tree Selection by Indian Peafowl in Karur, Tamilnadu.

S.NO	Roosting Tree Species	Tree Count	Height (m)	DBH (cm)	Roosting height (m)
1	<i>Mangifera indica</i> L.	5	18.08	113.60	3.78
2	<i>Syzygium cumini</i> (L.) Skeels	1	14.50	86.50	10.57
3	<i>Tectona grandis</i> L.f.	8	15.16	230.55	9.14
4	<i>Ricinus communis</i> L.	1	10.31	48.00	0.96
5	<i>Bambusa bambos</i> (L.)	4	22.57	-	5.91
6	<i>Ficus benghalensis</i> L.	3	16.06	522.33	7.96
7	<i>Moringa oleifera</i> Lam	5	9.75	41.83	2.35
8	<i>Prunus dulcis</i> (Mill.) D. A. Webb	1	8.50	115.00	4.94
9	<i>Tamarindus indica</i> L.	11	15.52	209.54	7.69
10	<i>Manilkara zapota</i> (L.) P. Royen	2	23.31	263.50	7.25
11	<i>Thespesia populnea</i> (L.) Sol.	7	9.24	56.42	4.55
12	<i>Azadirachta indica</i> A. Juss.	4	16.00	189.25	5.45
13	<i>Ficus religiosa</i> L.	2	27.5	243	4.00
14	<i>Albizia saman</i> F. Muell.	1	24	186	10.6

Indian peafowl Conservation Mindset on local people in Karur villages reveal that a maximum number of people opined that the population of Indian peafowl was increasing due to the population decline of Indian Fox and they replied that the main reason for invading the human habitation by Peafowl was due to the lack of food and water (n=31), followed by habitat alteration (n=19).

Most of the activities of birds are either advantageous or disadvantageous to crop cultivation but mostly, they create a negative impact on most of the agricultural activities. For analyzing the crop damaged by Indian Peafowl. We made a direct interview with 30 landowners, The result revealed that Paddy (35%) is damaged dominantly, followed by red chili (25%), corn (20%); on the other side onion (10%) has minimum damage. Till now there is no prevention method discovered to stop Indian peafowl from damaging crops but some farmer cultivate a dense circumstance of pearl millet around the agricultural field as a fence to reduce the entrance of peafowl and other-hand the majority of the farmers (n=23) are having negative mindset on peafowl conservation due to damaging their cultivated crops. But the minimum number of farmers (n=7) accept these activities of the peacock as the natural ones. Agricultural coolies (n=20) reveals that the population of Indian peafowl increase tremendously within 4-6 years.

### Dominant crop cultivation and pesticide

In the study area, Paddy was a dominantly cultivated crop followed by maize, groundnut, chili, Onion and Sunflower, drum stick, turmeric is less cultivating the crop. The pesticide usage results show that Divax-76 is a highly used one, followed by Pyriban -1.5, Tafgor-30, and NOK-50 is the least used. Dominant weedicide used in Karur Region is Cedar-41, followed by Sweep-41, Roundup-41 and Weednash is the least used by farmers. Likewise, Fungicide dominantly used is Bavistin-50, followed by Saaf-12, Uthane-M-45 and Blitox-50-W are less used fungicides in this region but the fungicide doesn't play a dominant role as the other.

### DISCUSSION

The present study on Indian peafowls was carried out in three different selected villages of Karur District, Tamil Nadu. A total of 1356 peafowls were encountered in 576 repeated sightings. Total sighting consists of 328 adult males, 601 adult females, 160 subadult males, 252 sub-adult females, and 15 juveniles with an encounter rate of 2.26 individuals per kilometer. The sex ratio of adult males and females was 328:601 (1:1.74). Similarly, (Samson et al. 2018) recorded that a total of 1091 peafowls consisting of 228 adult males, 384 adult females, 152 subadult male, 313 sub-adult female and 14 juveniles were counted in 487 repeated sightings in 1080 km of transect with the encounter rate of 1.01. The sex ratio of adult males and females was 380:697 (0.55:1.83) in Mudumalai Tiger Reserve. Rajadurai (1988) reported a sex ratio of 1468:1677 (1:1.4) Injar and Viralimalai in Tamilnadu respectively. Sathyanarayana, (2004) says that Indian peafowl is also found in agricultural fields. In the same way, McGowan & Garson (1995) describe the Indian peafowl as

a bird of scrub, (Brickle et al. 2002) states that they show affinity to deciduous forests and semiarid biomes. It prefers open areas for lekking (displaying feather) and dust bathing (Yasmin et al. 1996), (Harikrishnan et al. 2010). The high abundance of peafowl are found in dry agricultural land and near the riverside area which may be due to the availability of sufficient food plants, insects, roosting trees and a good ground cover for breeding and protection, (Trivedi et al. 1995) reported that the scrub habitat had thickets with climbers in the canopy, possessed thorny undergrowth and river banks with tall trees provided the peafowls to escape from the predators.

To conserve Indian peafowl in an area, it also depends on Roosting tree hence information on roost selection by an Indian peafowl carries huge importance for assessing its conservation needs. Judicious selection of roosting sites improves the survival rate of birds under reduced heat loss, information sharing accountability of population, and better protection from predators (Gadgil et al. 1972), (Gadgil et al., 1975), (Dodia et al. 2011). In the present study, it was found that most of the time in the sun Indian peafowl have rest in the shade of a tree but in the evening time, they prefer open areas. The peafowl prefers heavy branches of trees which can hold up the bird's weight and where peafowl would also able to move without any obstacles (Sharma et al. 1983), (Parasharya et al., 1999) A total of 14 species was identified as roosting tree site, In which the maximum number of roosting peafowls was found in *Tamarindus indica* L. (20%) followed by *Tectona grandis* L.f. (14.5%), *Thespesia populnea* (L.) Sol. (12.7%), *Mangifera indica* L. (9%), and *Moringa oleifera*. Lam (9%). A previous study in a nearby area reported that *Tamarindus indica* L. (18.21%) is more frequently used for roosting (Kalaiselvan et al. 2014), Rajadurai (1988) also reported that the maximum number of peafowls roost in *Tamarindus indica* L. (35.62%) trees in semi-wild conditions. Veeramani (1990) reported that in *Acacia catechu* (L. f.) Willd. (69%) the maximum number of roosting was recorded. (Samson et al. 2018) recorded that *Tectona grandis* L.f. is the dominant tree species for roosting in Mudumalai Tiger Reserve. It was observed that the peafowls preferred roosting at different heights and branches of the tree. In the study area, the average height of roosting is 6.08 m but, most of the peafowl were found roosting at a height of 5-19 m, an average height of 8.12 m. (Trivedi et al. 1995) recorded that peafowls roost at heights of above 15 m in Gir Forest. Based on the present study it can be said that the peafowls are active between 06:30 and 09:30 a.m. and 4:30 and 6:30 p.m. Likewise, Hillgarth (1984) reported that the peafowls were most active between 09:00 and 11:00 a.m. and 5:00 and 6:00 p.m. (Navaneethakannan et al. 1984) also observed that the peafowls were most active in the early morning and afternoon. (Samson et al. 2018) said the peafowl are active between 06:40 and 10:00 a.m. and 4:00 and 6:30 p.m.

The Indian Peafowl is under threat from various sources which include the demand for feathers and wild meat, conflict with farmers, increased use of chemical fertilizers, pesticides,

which is a hazard to the chicks (McGowan et al. 1995), and habitat degradation. An adult peacock has about 200 tail feathers, which sheds it from August onwards; it reappears and fully developed in February (Sharma et al. 1974), (Ali et al. 1980). The fallen feathers are collected and sold in local markets. Other threats include habitat degradation and loss - more notably from the change of their habitat into agricultural habitation and industrial growth, poisoning to counter crop damage, consumption of eggs and fat extracts for medicinal values, and killing for its wild meat. Although these threats are believed to be causing an alarming decline in populations, the magnitude and pattern of the effects in different parts of the country are yet to be quantified.

## CONCLUSION

The present study shows that the population dynamic and threats faced by the peafowl in Karur district, Tamil Nadu, it is recommended that long-term studies are important to suggest various impacts on wild animals. We should record the population range and provide residence to them, it will impact on ecosystem. Peafowl is under threat from various sources which include the demand for feathers and wild meat, conflict with farmers, increased use of chemical fertilizers, pesticides, which is a hazard to the chicks, and habitat degradation, So make the following things like decrease or stop hazardous things usage.

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