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RESEARCH ARTICLE

DENSITY OF INDIAN BLUE PEAFOWL (*PAVO CRISTATUS*) IN DIFFERENT MICROHABITATS AT THANJAVUR DISTRICT, TAMIL NADU

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Abstract

A total of 260 observations were taken into account to obtain the density of Indian Blue Peafowl (*Pavo cristatus*) in all the transects in the study area. This average abundance consisting of 64 Peacocks, 140 Peahens and 56 chicks were obtained from August 2023 to July 2024 (12 months). The present study area actually covering Thanjavur district (10.7870° N 79.1378° E) which includes the taluks of Kumbakonam, Thiruvudaimaruthur, Papanasam, Thiruvaiyaru and Thanjavur. The data on the abundance of Indian Peafowl were obtained from 57 Transects in the study area and which includes 13 micro habitats. The study area which covering the various microhabitats such paddy crop, cotton plant, bamboo, commercial flower gardens, sugar cane field, banana plant, mango tree groove, coconut tree plantation, bushes of acacia sp, palm tree ground, papaya tree, black gram plant and ground nut plant field etc. All the transects were accounted for density estimation in the study area for Indian Blue Peafowl. Totally 57 transects/areas were studied for the density (Density, Upper Confident Level and Lower Confident Level at 95%) of Indian Blue peafowl. Among the transects, the highest mean density was 8.73/km sampled (Density 8.73; UCL 11.03 and LCL 7.23) observed in Erumaipatti area. Contrary, the lowest mean density of Indian Blue Peafowl was 2.45/km sampled in Rajagiri area (Density 2.45; UCL 4.75 and LCL 0.95). The other transects/areas were recorded the moderate density for Indian Blue Peafowl. The study area covered were 13 type of microhabitats in the study area such Paddy crop, Cotton plant, Bamboo, commercial flower gardens, Sugar cane field, Banana plant, Mango tree groove, Coconut tree plantation, Bushes of Acacia sp, Palm tree ground, Papaya tree, Black gram plantation and Ground nut plant field. The density of Indian Blue fowl was 115.85/ km sampled in paddy field (Density 115.85; UCL 118.15 and LCL 114.55 recorded. The minimum density was obtained (4.38/ km sampled) in the commercial flower gardens (Mean density 4.38; UCL 6.68 and LCL 3.08. The density of Indian Blue fowl in different sex were studied and it showed the highest density was found in the Paddy field in the case of cock. The maximum density was 33.27/km sampled (Density 33.27; UCL 35.57

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and LCL31.97) in the paddy field. The minimum density of cock were recorded in the ground nut 1.45/km sampled (Density 1.45; UCL 3.75 and LCL 0.15).The density of Indian Blue fowl in the case of hen it was (74.91/km sampled) high (Mean density74.91; UCL 77.21 and LCL 73.61). The low density of hen was recorded (2.55/km sampled) in the commercial flower gardens (Density 2.55; UCL 4.85 and LCL 1.25).The chicks were accounted to find out the density of Indian Blue peafowls and the maximum density was 28.73/km sampled in the paddy field (Density 28.73; UCL 31.03 and LCL 27.43). The minimum density of chicks of peafowl 1.09/km sampled in the ground nut plantations (Density 1.09; UCL 3.39 and LCL 0)were obtained in the study area.

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Introduction:-

India's national bird, the Indian Blue Peafowl *Pavo cristatus* (henceforth, peafowl), is listed under Schedule I of the Indian Wild Life (Protection) Act, 1972, and in Appendix I of the CITES treaty. It is an omnivorous and gregarious, and is seen in open and deciduous forests, different types of plantations, and human habitations [1] and [2]. Accidental poisoning is another major threat [3]. In India, as mentioned above, no studies have been conducted to measure the extent of crops that peafowl damage. According to Bird Life International [4]*Pavo cristatus* species to be studied thoroughly the ecology, food habits, breeding biology etc. Many workers draw particular attention to the need of quantitative accurate and comprehensive maps of species distribution and abundance. Without such a database in many fragmented areas it will not be possible to plan priorities in conservation. Hence this species is highly emphasized and it is essential to take up in-depth research on the population and habitats in the fragmented areas in the southern parts of India.

It faces the threats of poaching for its meat, feathers, and for use in traditional medicines. Accidental poisoning is another major threat [5]; [6];[7]; [8]. Crop depredation by peafowl is a serious issue, and has been reported from some areas in India [9]; [10]; [11];[12].The Indian Peafowl is regarded as protected species through the Indian Wildlife Protection Act (1972) and listed as least concern (LC) by the International Union for Nature (IUCN). According to Bird Life International [4]*Pavo cristatus* species to be studied. Even though there are several threats against this species and for their survival in many parts of the fragmented areas in the country. The Indian Peafowl is native to south Asia, but introduced and semi feral in many other parts of the world. The Indian Peafowl is under the inclusion of Order Galliformes, Family Phasianidae, Genus *Pavo cristatus* [1].

Quantifying the damage, and immediately disbursing sufficient ex-gratia to the victims could ameliorate the human-animal conflict [13 and [14]. The Indian Peafowl is omnivorous and eats seeds, insects, fruits, small mammals, and reptiles [15]. Around cultivated areas, the peafowl feeds on a wide range of crops such as groundnut (*Arachis hypogaea* L.), tomato (*Solanum melongena* L.), paddy (*Oryza* spp.), Red chilli (*Capsicum annuum* L.) and even bananas (*Musa* sp.) [16]. [17] worked on the Indian peafowl distribution at Kerala. [18] studied on the status of Indian blue peafowl in the villages near the Kumbakonam region of Tamil Nadu . In India, as mentioned above, no thorough studies have been conducted to estimate density and measure the extent of crops that peafowl damage.In this study, an attempt has been made to estimate the density Indian blue peafowl in the selected areas in five different Taluks (Kumbakonam, Thiruvudaimaruthur, Papanasam, Thiruvaiyaru and Thanjavur) in Thanjavur District of Tamil Nadu with the following objectives.

Many workers draw particular attention to the need of quantitative accurate and comprehensive maps of species distribution and abundance. Without such a database in many fragmented areas it will not be possible to plan priorities in conservation. Hence this species is highly emphasized and it is essential to study in depth research on the population and habitats in the fragmented areas in the southern parts of India. The objectives of the current work:

1. To estimate the overall density of Indian Blue Peafowl in the study area.
2. To estimate the density of Indian Blue Peafowl in different microhabitats in the study areas
3. To find out the sex-wise density estimation in different microhabitats

Materials and Methods:-

The estimate of Indian blue peafowl was carried out along the transects and foot paths in the available habitats such cultivated crop lands and natural habitat areas. On each sighting of the Peafowl the variables such as the total number of individuals (Peacocks, Pea hens and Chicks), group size, and vegetation type was recorded. The Indian peafowl roosting sites and trees was also surveyed and recorded. The roost tree was be confirmed seeing the birds directly at dawn and dusk. The details such tree (n), tree height (m), tree diameter at breast height (cm), habitat type and micro variables, the date, time were recorded. The presence of dropping indirect evidences in the habitats also recorded. The Estimation of Peafowl has been carried out along the transects and foot paths in the available cultivated crop lands, non- cultivated lands and natural habitats in the chosen study areas from August 2023 to July 2024. The standard line transects method described by [19]and [20] was adopted and followed. The length of each line transect was 1 km length. The data on the availability of habitats/micro habitats in study area were recorded. The data on sighting, number, perpendicular distance, date, time, habitat type and altitude were recorded. The study on the abundance, density and distribution of Indian Peafowl was carried out from August 2023 to July 2024 (12 months). The density of Indian Peafowl was estimated by using the data on DISTANCE software [19]. The density of Indian Blue peafowl was obtained in different areas and microhabitats (Upper and Lower confident level at 95% by using DISTANCE software).

Study area

The study area Thanjavur (10.7870° N 79.1378° E) District was chosen and it includes 57 study spots (Transects). This study area is an important delta region and (Granary of Tamil Nadu) in Tamil Nadu and it covers nine taluks in Thanjavur District of Tamil Nadu. A total of five different taluks such Kumbakonam, Thiruvudaimaruthur, Papanasam, Thiruvaiyaru and Thanjavur were chosen in Thanjavur District for the present work with the following objectives. The study area consists of 57 study locations or Transects (Table 1). The study was carried out from August 2023 to July 2024. The study area which covering the various microhabitats such paddy crop, cotton plant, bamboo, commercial flower gardens, sugar cane field, banana plant, mango tree groove, coconut tree plantation, bushes of acacia sp, palm tree ground, papaya tree, black gram plant and ground nut plant field etc. The present study was focused on the estimation of density for Indian blue peafowl in the selected areas.

Results And Discussion:-

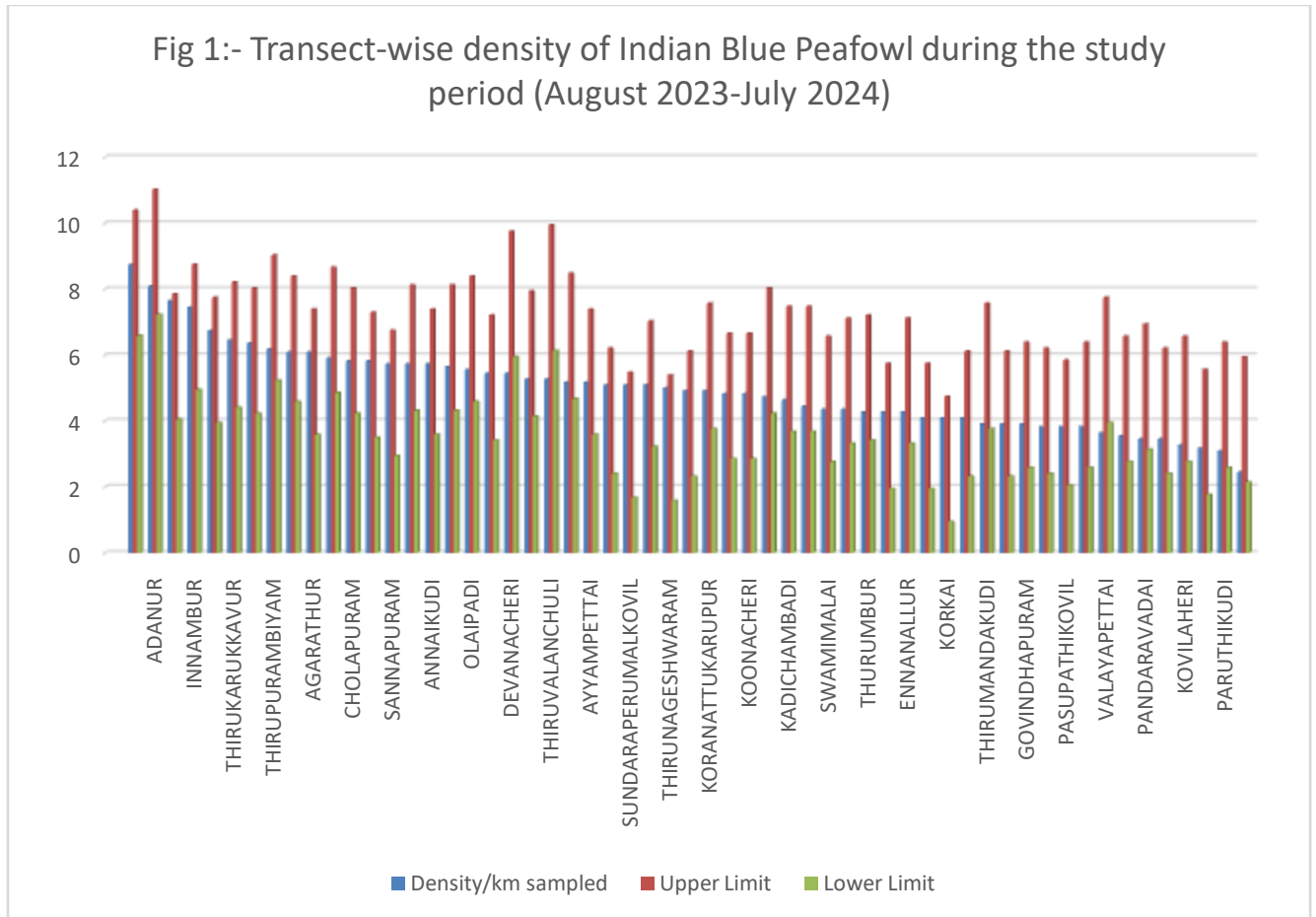
Overall Density of Indian Blue Peafowl

A total of 260 observations were obtained for Indian Blue Peafowl in all the transects in the study area though out the study period. This abundance consisting of 64 Peacocks, 140 Peahens and 56 chicks were obtained during the study period from August 2023 to July 2024 (Table 1-5). The data on the abundance of Indian Peafowl were obtained from 57 Transects in the study area (Table 1) and which includes 13 micro habitats. The chosen study area which covered the various microhabitats such Paddy crop, Cotton plant, Bamboo, commercial flower gardens, Sugar cane field, Banana plant, Mango tree groove, Coconut tree plantation, Bushes of Acacia sp, Palm tree ground, Papaya tree, Black gram plant and Ground nut plant field etc.

Table 1:- Transect-wise density of Indian Blue Peafowl during the study period. (August 2023-July 2024)

TRANSECT CODE	TRANSECT/AREA NAME	No. of Peafowl (N)	Density/km sampled	Upper Confident Level (95%)	Lower Confident Level (95%)
1	ADANUR	89	8.09	10.39	6.59
2	ERUMAI PATTI	96	8.73	11.03	7.23
3	OLAIPADI	61	5.55	7.85	4.05
4	THIRUKARUKKAVUR	71	6.45	8.75	4.95
5	VANNAKUDI	60	5.45	7.75	3.95
6	ADUTHURAI	65	5.91	8.21	4.41
7	SANNAPURAM	63	5.73	8.03	4.23
8	ANDALAMPETTAI	74	6.73	9.03	5.23
9	THIRUVIDAIMARUTHUR	67	6.09	8.39	4.59
10	SUNDARAPERUMALKOVIL	56	5.09	7.39	3.59
11	VEPPATHUR	70	6.36	8.66	4.86
12	ANNAIKUDI	63	5.73	8.03	4.23
13	THIRUNAGESHWARAM	55	5.00	7.3	3.5

14	THIRUBUVANAM	49	4.45	6.75	2.95
15	CHOLAPURAM	64	5.82	8.12	4.32
16	THIRUMANGALAKUDI	56	5.09	7.39	3.59
17	AMMACHATHIRAM	64	5.82	8.12	4.32
18	AGARATHUR	67	6.09	8.39	4.59
19	KORANATTUKARUPUR	54	4.91	7.21	3.41
20	INNAMBUR	82	7.45	9.75	5.95
21	GONTHAGAAI	62	5.64	7.94	4.14
22	ERAHARAM	84	7.64	9.94	6.14
23	THIRUPURAMBIYAM	68	6.18	8.48	4.68
24	KONDASAMUTHIRAM	56	5.09	7.39	3.59
25	GOVINDHAPURAM	43	3.91	6.21	2.41
26	SATHANUR	35	3.18	5.48	1.68
27	THIRUVISANALLUR	52	4.73	7.03	3.23
28	PARUTHIKUDI	34	3.09	5.39	1.59
29	THIPPIRAJAPURAM	42	3.82	6.12	2.32
30	THIRUVALANCHULI	58	5.27	7.57	3.77
31	SWAMIMALAI	48	4.36	6.66	2.86
32	PAPANASAM	48	4.36	6.66	2.86
33	DHARASURAM	63	5.73	8.03	4.23
34	THITTAI	57	5.18	7.48	3.68
35	AYYAMPETTAI	57	5.18	7.48	3.68
36	THURUMBUR	47	4.27	6.57	2.77
37	UMBALAPADI	53	4.82	7.12	3.32
38	SARUKKAI	54	4.91	7.21	3.41
39	ALAVANDHIPURAM	38	3.45	5.75	1.95
40	KOONACHERI	53	4.82	7.12	3.32
41	PANDARAVADAI	38	3.45	5.75	1.95
42	RAJAGIRI	27	2.45	4.75	0.95
43	PASUPATHIKOVIL	42	3.82	6.12	2.32
44	UMAIYALPURAM	58	5.27	7.57	3.77
45	KABISTHALAM	42	3.82	6.12	2.32
46	SATHYAMANGALAM	45	4.09	6.39	2.59
47	THIRUMANDAKUDI	43	3.91	6.21	2.41
48	ASUR	39	3.55	5.85	2.05
49	ATHIYUR	45	4.09	6.39	2.59
50	DEVANACHERI	60	5.45	7.75	3.95
51	ENANALLUR	47	4.27	6.57	2.77
52	KADICHAMBADI	51	4.64	6.94	3.14
53	KALLUR	43	3.91	6.21	2.41
54	KONTHANGUDI	47	4.27	6.57	2.77
55	KOVILACHERI	36	3.27	5.57	1.77
56	KORKAI	45	4.09	6.39	2.59
57	VALAYAPETTAI	40	3.64	5.94	2.14
Overall		3124			



All the transects were accounted for density estimation in the chosen study area for Indian Blue Peafowl. Totally 57 transects/areas were studied for the density (Mean Density, Upper confident Level and Lower Confident Level) of Indian Blue peafowl. Among the transects, the highest mean density was 8.73/km sampled (Mean Density 8.73; UCL 11.03 and LCL 7.23) observed in Erumaipatti area (Transect 2). Contrary, the lowest mean density of Indian Blue Peafowl was 2.45/km sampled in Rajagiri (Transect 42) area (Mean density 2.45; UCL 4.75 and LCL 0.95). The other transects/areas were recorded the moderate density for Indian Blue Peafowl (Table 1 & Fig 1).

Microhabitats of overall Indian Blue Peafowl

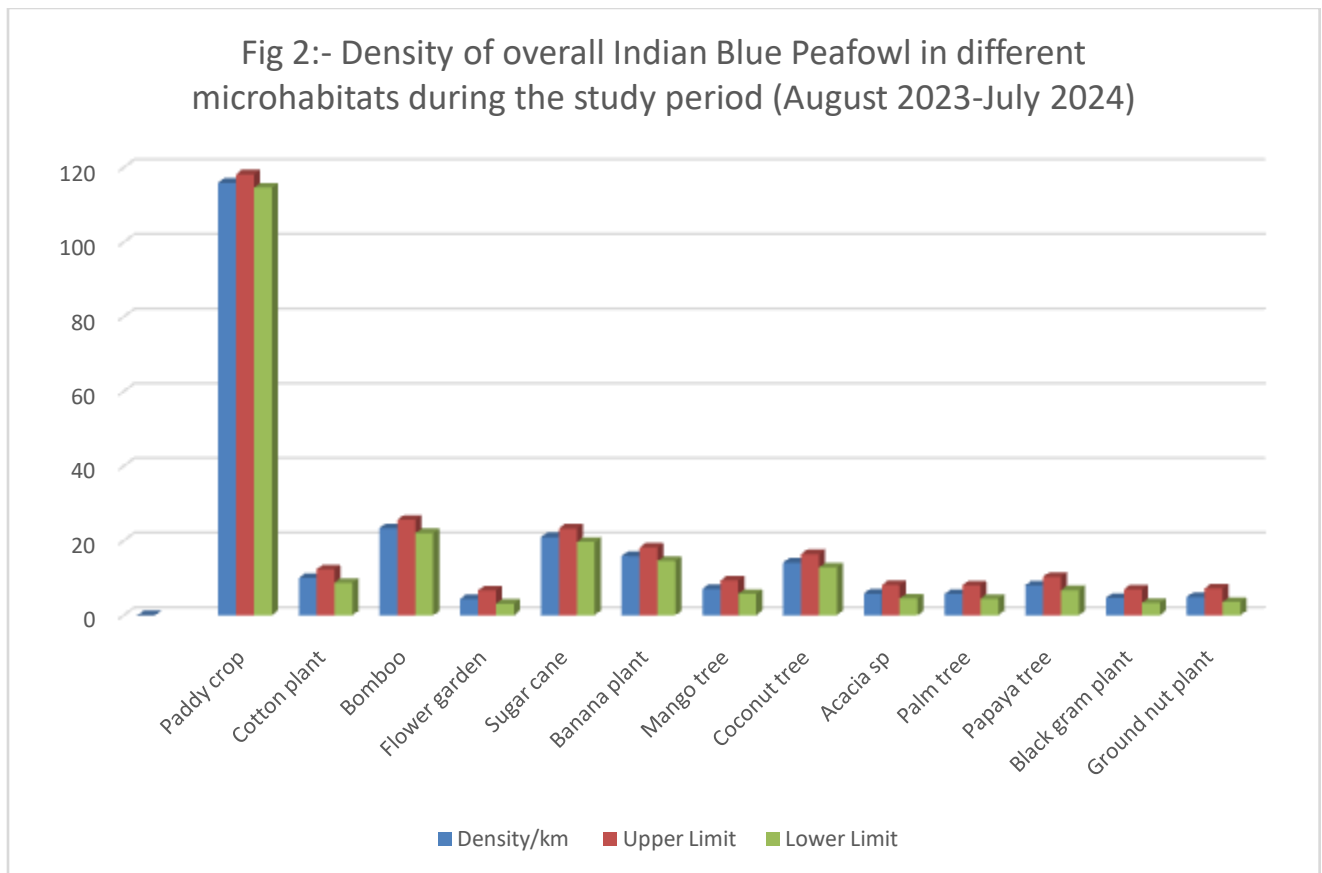
There were 13 type of microhabitats in the study area such Paddy crop, Cotton plant, Bamboo, commercial flower gardens, Sugar cane field, Banana plant, Mango tree groove, Coconut tree plantation, Bushes of Acacia sp, Palm tree ground, Papaya tree, Black gram plant and Ground nut plant field.

The density of Indian Blue fowl was 115.85/ km sampled in Paddy field (Mean density 115.85; UCL 118.15 and LCL 114.55 recorded). The minimum density was obtained (4.38/ km sampled) in the commercial flower gardens (Mean density 4.38; UCL 6.68 and LCL 3.08 (Table 2 & Fig 2). The other microhabitats such cotton plant, Bamboo vegetations, Sugar cane field, Banana plant, Mango tree groove, Coconut tree plantation, Bushes of Acacia sp, Palm tree ground, Papaya tree, Black gram plant and Ground nut plant field which showed the moderate density of Indian Blue peafowl.

Table 2:- Density of overall Indian Blue Peafowl in different microhabitats during the study period. (August 2023-July 2024)

S.NO	MICROHABITAT	No. of Indian Blue Peafowl	Density/km sampled	Upper Confident Level (95%)	Lower Confident Level (95%)

		(N)			
1	Paddy crop	1506	115.85	118.15	114.55
2	Cotton plant	130	10.00	12.30	8.70
3	Bamboo	303	23.31	25.61	22.01
4	Flower garden	57	4.38	6.68	3.08
5	Sugar cane	272	20.92	23.22	19.62
6	Banana plant	206	15.85	18.15	14.55
7	Mango tree	91	7.00	9.30	5.70
8	Coconut tree	183	14.08	16.38	12.78
9	Acacia sp	75	5.77	8.07	4.47
10	Palm tree	74	5.69	7.99	4.39
11	Papaya tree	104	8.00	10.30	6.70
12	Black gram plant	60	4.62	6.92	3.32
13	Ground nut plant	63	4.85	7.15	3.55
TOTAL		3124			

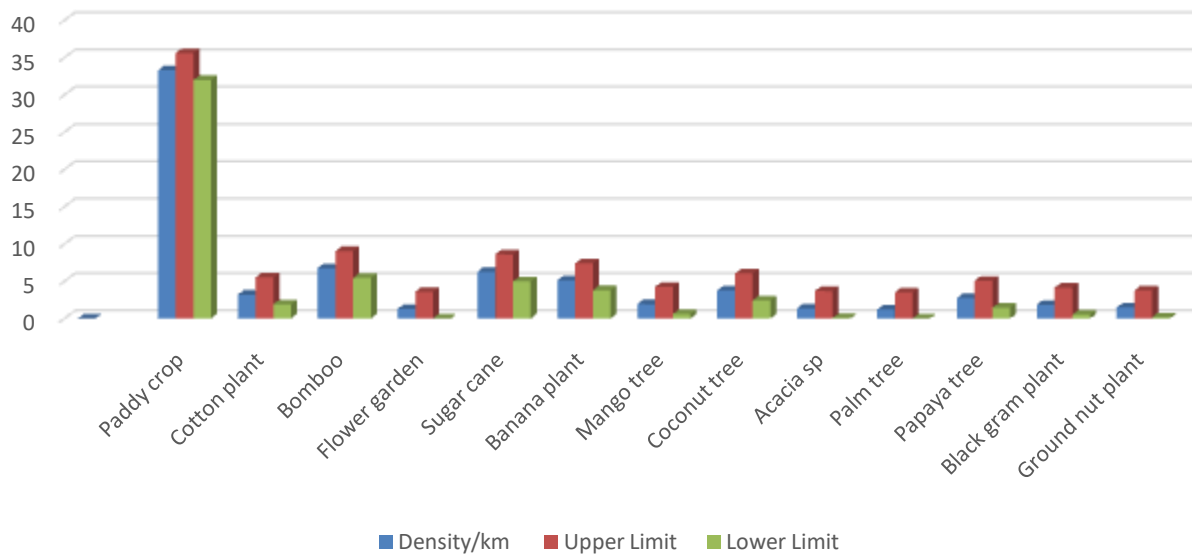


Microhabitats of Indian Blue Peafowl (Peacocks)

The density of Indian Blue fowl in different sex (peacock, peahen and chick) were studied. The present study revealed the highest density was found in the paddy field in the case of cock. The density of peacock was 33.27/km sampled (Mean density 33.27; UCL 35.57 and LCL 31.97) in the paddy field. The minimum density (1.45/km sampled) of cock were recorded in the ground nut plantation (Mean density 1.45; UCL 3.75 and LCL 0.15) Table 3 & Fig 3. The other microhabitats such cotton plant, Bamboo, commercial flower gardens, Sugar cane field, Banana plant, Mango tree groove, Coconut tree plantation, Bushes of Acacia sp, Palm tree ground, Papaya tree plantation and Black gram plantation which showed the moderate density of peacock.

Table 3:- Density of Indian Blue Peafowl (Cock) in different microhabitats during the study period. (August 2023-July 2024)

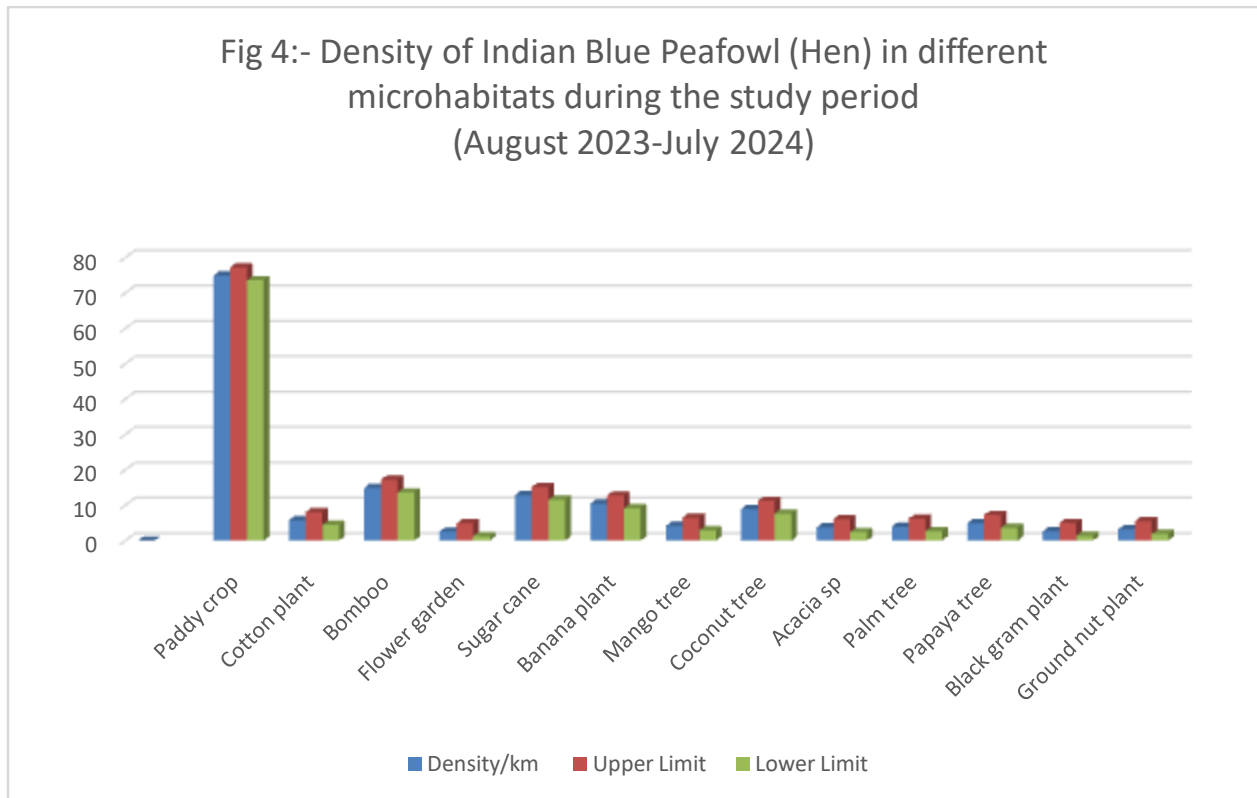
S.NO	MICROHABITAT	No. of Peacock (N)	Density/km sampled	Upper Confident Level (95%)	Lower Confident Level (95%)
1	Paddy crop	366	33.27	35.57	31.97
2	Cotton plant	35	3.18	5.48	1.88
3	Bamboo	74	6.73	9.03	5.43
4	Flower garden	14	1.27	3.57	0
5	Sugar cane	69	6.27	8.57	4.97
6	Banana plant	56	5.09	7.39	3.79
7	Mango tree	21	1.91	4.21	0.61
8	Coconut tree	41	3.73	6.03	2.43
9	Acacia sp	15	1.36	3.66	0.06
10	Palm tree	13	1.18	3.48	0
11	Papaya tree	30	2.73	5.03	1.43
12	Black gram plant	20	1.82	4.12	0.52
13	Ground nut plant	16	1.45	3.75	0.15
TOTAL		770			

Fig 3:- Density of Indian Blue Peafowl (Cock) in different microhabitats during the study period (August 2023-July 2024)**Microhabitats of Indian Blue Peafowl (Peahens)**

The density of Indian Blue peafowl in the case of hen it was high (74.91/km sampled) in the paddy field (Mean density 74.91; UCL 77.21 and LCL 73.61). The low density of hen was recorded (2.55/km sampled) in the commercial flower gardens (Mean density 2.55; UCL 4.85 and LCL 1.25) Table 4 & Fig 4. The other microhabitats such cotton plant, Bamboo, Sugar cane field, Banana plant, Mango tree groove, Coconut tree plantation, Bushes of Acacia sp, Palm tree ground, Papaya tree, Black gram plant and Ground nut plant field which showed the moderate density of peahens.

Table 4:- Density of Indian Blue Peafowl (Hen) in different microhabitats during the study period. (August 2023-July 2024)

S.NO	MICROHABITAT	No. of Peahen (N)	Density/km sampled	Upper Confident Level (95%)	Lower Confident Level (95%)
1	Paddy crop	824	74.91	77.21	73.61
2	Cotton plant	63	5.73	8.03	4.43
3	Bamboo	164	14.91	17.21	13.61
4	Flower garden	28	2.55	4.85	1.25
5	Sugar cane	141	12.82	15.12	11.52
6	Banana plant	115	10.45	12.75	9.15
7	Mango tree	46	4.18	6.48	2.88
8	Coconut tree	98	8.91	11.21	7.61
9	Acacia sp	41	3.73	6.03	2.43
10	Palm tree	43	3.91	6.21	2.61
11	Papaya tree	54	4.91	7.21	3.61
12	Black gram plant	29	2.64	4.94	1.34
13	Ground nut plant	35	3.18	5.48	1.88
TOTAL		1681			



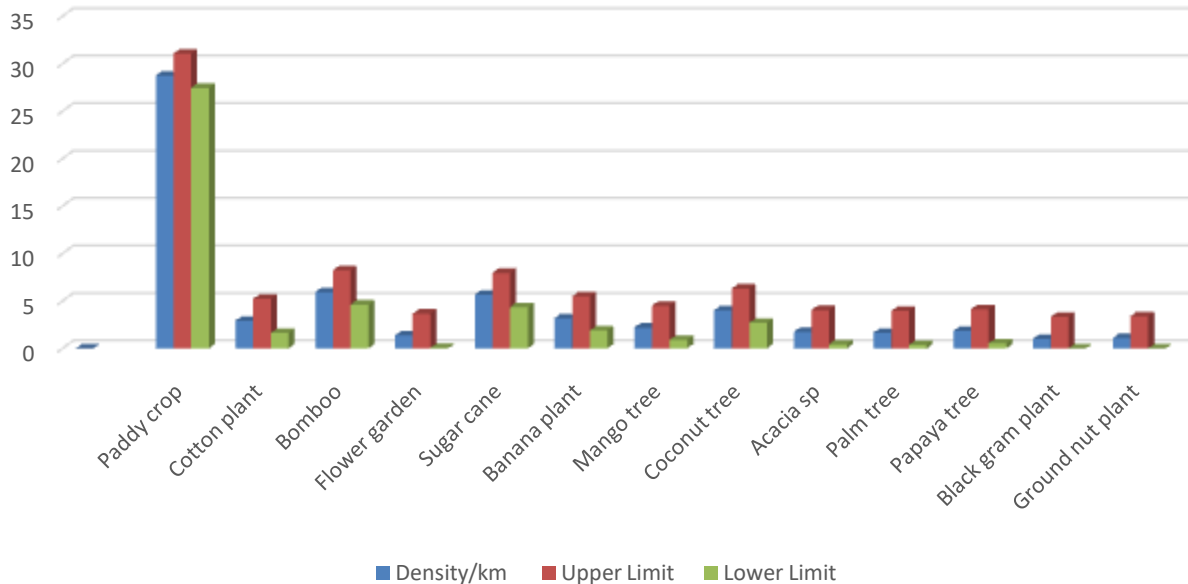
Microhabitats of Indian Blue Peafowl (Chicks)

All the chicks were accounted to find out the density of Indian Blue peafowl chicks. The maximum density was 28.73/km sampled in the paddy field (Mean density 28.73; UCL 31.03 and LCL 27.43). The minimum density of chicks of peafowl were 1.09/km sampled in the ground nut plantations (Mean density 1.09; UCL 3.39 and LCL 0) Table 5 & Fig 5. The other 11 microhabitats such cotton plant, Bamboo, commercial flower gardens, Sugar cane field, Banana plant, Mango tree groove, Coconut tree plantation, Bushes of Acacia sp, Palm tree ground, Papaya tree, Black gram plant and were found with the moderate density of chicks.

Table 5:- Density of Indian Blue Peafowl (Chicks) in different microhabitats during the study period (August 2023-July 2024)

S.NO	MICROHABITAT	No. of Chicks (N)	Density/km sampled	Upper Confident Level (95%)	Lower Confident Level (95%)
1	Paddy crop	316	28.73	31.03	27.43
2	Cotton plant	32	2.91	5.21	1.61
3	Bamboo	65	5.91	8.21	4.61
4	Flower garden	15	1.36	3.66	0.06
5	Sugar cane	62	5.64	7.94	4.34
6	Banana plant	35	3.18	5.48	1.88
7	Mango tree	24	2.18	4.48	0.88
8	Coconut tree	44	4.00	6.3	2.7
9	Acacia sp	19	1.73	4.03	0.43
10	Palm tree	18	1.64	3.94	0.34
11	Papaya tree	20	1.82	4.12	0.52
12	Black gram plant	11	1.00	3.3	0
13	Ground nut plant	12	1.09	3.39	0
TOTAL		673			

Fig 5:- Density of Indian Blue Peafowl (Chicks) in different microhabitats during the study period (August 2023-July 2024)



The distribution and density of Indian Blue Peafowl were found in all the transects and microhabitats in the study area. However, density is differed among the transects (study spots) and in microhabitats The highest density was observed in particular transect (Erumaipatti area) and contrary, the lowest density of Indian Blue Peafowl was recorded in Rajagiri area. The reason may be due to the transects which covered and located in Rajagiri area was nearby railway tracks. Totally 13 microhabitats were studied in which paddy field showed that preferred microhabitats than other habitats. Such finding which supported by [21]. The Peacock, peahen and chicks were preferred paddy field as microhabitat. The least density of peafowls was showed in the commercial flower gardens, ground nut plantations etc.,Based on the minimum densities in various microhabitats and it is concluded that these are the least preference of microhabitats for Indian Blue peafowl. Similar observation wasrecorded[22]. The

fondness of higher densities in paddy field may be due to availability of grains and used as feeding ground for peafowl[23]. The lower densities in commercial flower gardens ground nut plantations may be due to not availability of food grains and poor escaping cover for protection[24]. The other microhabitats such Cotton plant, Bamboo, Sugar cane field, Banana plant, Mango tree grove, Coconut tree grooves, bushes of Acacia sp, Palm tree, Papaya tree and black gram plantation showed the moderate fondness of densities. These other microhabitats may provide protection covers and feeding grounds to peafowls including chicks.

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