



## ORIGINAL ARTICLE

**Foraging Habits of Indian Peafowl at Various Sites in Bharatpur****Ashok Mittal<sup>1</sup>, Sangeeta Chaturvedi<sup>1</sup> and Rajeev Sharma<sup>2</sup>**<sup>1</sup>Department of Zoology, M.S.J. College, Bharatpur<sup>2</sup>Department of Zoology, R.B.S. College, AgraEmail: [geetishi@gmail.com](mailto:geetishi@gmail.com)Received: 19<sup>th</sup> July 2017, Revised: 28<sup>th</sup> August 2017, Accepted: 5<sup>th</sup> September 2017**ABSTRACT**

Birds are most essential part of our ecosystems and a source of endless fascination and inspiration. Peafowl are most sensitive birds living nearby human population and may be used as indicators of environment values. Peafowl preferred moist and dry-deciduous forests to live, but they can easily adapt cultivated regions i.e. agricultural fields, gardens and usually where water is available, where they consumed crops, fruits seeds and flowers, grasses, herbs, scrub, trees and berries, grains but will also prey animal and insects like grasshopper, snakes, lizards, and small rodents. Indian peafowl is 'omnivorous' in nature and yet primarily vegetarian birds, and also feed more on crop edges than in centre. At Keoladeo National Park, Indian peafowl showed maximum preference to grasses and herbs as recorded highest. The findings on seasonal preferences of maximum foraging in summer at Keoladeo National Park was noticed in grassland area due to the presence of food and diversity, in rainy season was observed in wet land area and winter season, Indian peafowl showed maximum preference to grassland area. Keoladeo National Park is the most suitable site for better development of peafowl due to the presence of natural resources and safety.

**Key words:** Foraging Habits, Indian Peafowl, Bharatpur

**INTRODUCTION**

India has rich diversity of Galliformes which includes more than 200 bird species i.e. turkeys, gouse, chickens, quails and pheasants. These birds are commonly known as gamefowl or gamebirds, landfowl, gallinaceous birds or galliforms. The family Phasianidae, being one of the largest families of Galliformes, includes 38 genera and around 138 species including the largest sized peafowl (del Hoyo, *et al.*, 1992). Among them, blue peafowl, *Pavo cristatus*, commonly called as Mor or Mayur, is the most common pheasant of India and is designated as national bird of India. *Pavo cristatus* inhabits mostly in the semi arid conditions *viz.*, Bhutan, Eastern China, India, Nepal, Pakistan and Sri Lanka (Dharmakumarsinhji and Lavkumar 1981). In India, *Pavo cristatus* is distributed in the Gujarat, Haryana, Madhya Pradesh, Punjab, Rajasthan and Uttar Pradesh. It is protected throughout the country, especially under the Schedule-1 of the Indian wildlife protection Act, 1972 and its subsequent amendment and Appendix-1 of CITES (Dodia 2011). Most of the work on habitat use has been done on cover preferences, movement pattern of pheasant (Hill and Robertson 1986 and Padding 1988) at different places in Rajasthan as well as Uttar Pradesh. Some authors believe that Indian Peafowl is 'omnivorous' in nature and yet primarily vegetarian birds, and also feed more on crop edges than in centre (Baker 1915; Kashkarov, *et al.*, 1926 and Harlin 1974). Although, no much information is available on foraging habit of peafowl with some exception, therefore, present objective has been designed to study the foraging habitat of Indian Peafowl at Bharatpur, with special emphasis on Keoladeo National Park.

**METHODS**

During extensive survey, habitat used by Indian Peafowl *Pavo cristatus* for purposes of foraging was observed at various places (Ghata-Sehu, Keoladeo National Park, Padam Villa Colony and Roopbas) in Bharatpur. Eight types of habitats were studied *viz.*, cropland, forest, grassland, hillock region, open land, residential, scrubland and wetland which were used by Indian Peafowl different experimental sites. The habitat was location specific and varied with sites in the district. The area of each habitat was calculated by using bike (motorcycle) with respect to every experimental site

(Ghata-Sehu, KNP, Padam Villa Colony and Roopbas). Therefore, number of peafowl performing foraging activity (crop land, forest, grassland, hillock region, open land, residential, scrub land and wet land) at every experimental site in Bharatpur were also recorded as per suggestions of Wiens and Rotenberry 1981; Winkler and Leisler 1985; Trivedi 1993; Subramanian and John 2001; Dodia 2011; and Chopra and Kumar 2012.

### STATISTICAL ANALYSIS

To calculate foraging activities of Indian Peafowl, number of peafowl with their activities (foraging) was noted down in their respective environment (habitat). However foraging of peafowl per hectare was calculated by using following formula:

Peafowl activity (foraging) per hectare =  $N/A$

N = Number of peafowl performing activities (foraging) in their respective habitat

A = Area of respective habitat (in hectare), where peafowl performing their Activities.

On the other hand, percent activity of foraging per population in respective habitats was documented via following formula:

Percent activity of foraging per population =  $N \times 100 / \Sigma N$

N = Number of peafowl performing activities in respective habitat

$\Sigma N$  = Total number peafowl performing activities

Data were collected by focal animal sampling method for three successive years (2010-11, 2011-12 and 2012-13) as per suggestions of Altmann 1974, Aebischer, *et al.*, 1993 and Chamberlain, *et al.*, 2005. Interestingly, data collected for foraging and numbers of peafowl performed activities in different seasons were subjected to one way ANOVA, calculated by using Minitab 11 for window software, and DMRT (Duncan's Multiple Range Test) were used for comparing date with each other.

### RESULTS

#### HABITAT SELECTION FOR FORAGING:

The foraging performed by Indian Peafowl, *Pavo cristatus* was observed at four experimental sites Ghata-Sehu, KNP, Padam Villa Colony and Roopbas in Bharatpur, Rajasthan. The habitat used by peafowl varied with each other, and also recorded as crop land, forest, grassland, hillock region, open land, residential, scrub land and wetland at Ghata-Sehu; forest, grassland, open area, scrub land and wet land at Keoladeo National Park (KNP); crop land, grassland, open land, residential, scrub land and wetland at Padam Villa colony; and grassland, open land, residential, crop land and wet land at experimental site Roopbas, respectively. All the observations were recorded for three successive years from 2010 to 2013 with respect to each experimental site.

At Ghata & sehu As far as foraging was concerned, it was observed highest in grassland as well as crop land area. However, maximum values for foraging activity of Indian Peafowl were observed as 4.07 peafowl/ha in grassland and 40.63 percent foraging/population in crop land area during experimental year 2010-11. This activity decreased in grassland (2.96 peafowl/ha) and increased in cropland (46.43 percent peafowl/population) area with coming experimental year 2012-13, respectively.

At KNP, Peafowl preferred grassland as well forest area for their foraging activities as compared to open area, scrub and wet land. The maximum values 0.07 peafowl/ha and 35.83 percent foraging/population were observed in grasslands during 2010-11. It increased and reached upto 1.11 peafowl/ha and 75.00 percent foraging/population in forest area during 2011-12. Moreover, it again decreased to 1.09 peafowl/ha and 68.03 percent peafowl/population in forest during 2012-13, respectively.

At Padam Villa Colony As far as foraging was concerned, maximum number of 7 followed by 6 and 4 peafowl was seen to performed activity in cropping area in year 2010-11, 2011-12 and 2012-13,

respectively. While calculating foraging per hectare, peafowl showed differential response in various habitats.

It obtained highest value of 0.09 peafowl foraging/ha in crop land in 2010-11, and also as 0.91 peafowl foraging/ha in wet land area in year 2011-12 and 2012-13, respectively. On the other hand, percent peafowl foraging per population attained highest value of 63.64 in experimental year 2010-11 and decreased consistently 60.00 and 44.44 percent peafowl foraging/population in year 2011-12 and 2012-13, respectively.

At Roopbas, the maximum number of 20, 19, and 23 peafowl performed foraging in wet land area in 2010-11 and in crop land area in 2011-12 and 2012-13, respectively. While calculating foraging per hectare, highest values were observed as 3.33 in 2010-11 and 2011-12 and 3.81 in 2012-13 in grassland area, respectively. On the other hand, overall highest percent population performed foraging in wetland area (39.22% foraging/population) in year 2010-11 and also in crop land area (29.69 and 28.40 % foraging/population) in year 2011-12 and 2012-13, respectively.

#### **HABITAT PREFERENCE FOR FORAGING:**

Indian Peafowl, *Pavo cristatus* used different habitat for foraging i.e., animal and insect, crops, fruits and flowers, grasses and herbs, and scrub and trees at different experimental sites of Bharatpur. At Keoladeo National Park, Indian Peafowl showed maximum preference to grasses and herbs which recorded highest individuals  $43.00 \pm 2.03$ ,  $51.00 \pm 1.52$  and  $54.00 \pm 1.30$  in year 2010-11, 2011-12 and 2012-13, respectively. Similarly, at Padam Villa Colony, highest preference was recorded on agriculture crops grown by the farmers as  $5.00 \pm 0.45$ ,  $5.00 \pm 0.84$  and  $4.00 \pm 0.66$  individuals in experimental year 2010-11, 2011-12 and 2012-13, respectively. At Ghata-Sehu and Roopbas variation, peafowl foraging was recorded with change of experimental year. At Ghata-Sehu, highest foraging preference of peafowl was recorded on grasses and herbs ( $13.00 \pm 0.71$  individuals) in year 2010-11 and also on crops ( $12.00 \pm 0.71$  and  $11.00 \pm 0.67$  individuals) in year 2011-12 and 2012-13, respectively. As far as Roopbas was concerned, a significant maximum peafowl foraging preference was obtained on grasses and herbs ( $14.00 \pm 0.84$  individuals) in first year and also on crops ( $19.00 \pm 1.14$  and  $23.00 \pm 0.84$  individuals) in second and third experimental years, respectively.

#### **DISCUSSION**

Habitat preference of Indian Peafowl was studied under two heads- First habitat selection for foraging; second preference food for foraging.

#### **HABITAT SELECTION FOR FORAGING:**

At Ghata & Sehu, foraging was highest in crop area due to availability of food and maximum population of peafowl in crop fields ranged from 40.63 to 46.43% in successive experimental years. The corroborative findings are Baumgartner and Martin 1939, Navneethakannan 1981, Yasmin and Yahya 1993 & 2000. At KNP, Foraging again showed variable pattern and observed highest habitat preference in forest area (68.03 to 75.00 %) followed by grassland (35.83 %). Similar findings have also been reported earlier by Holmes and Robinson 1981; Davison 1986, Sathyanarayana and Veeramani 1993, Yasmin and Yahya 2000 and Selvan, et al., 2013.

At Padam Villa Colony, for feeding or foraging, peafowl showed maximum (44.44 to 63.64 % population) preference to crop area than other habitats. The findings of Bhandary, et al., 1986; Yasmin 1995; Van Bael, et al., 2003 are in complete agreement with the present findings. At Rupbas, The finding on foraging revealed that peafowl showed preference to wet land (39.22 %) and also crop land area (28.40 to 29.69 %).

#### **HABITAT PREFERENCE FOR FORAGING:**

The foraging of Indian Peafowl, *Pavo cristatus* was recorded in different habitats i.e., small animal and insects, crops, fruits and flowers, grasses and herbs, and scrub and trees at all experimental sites. A variable pattern of habitat utilization was observed with change in experimental site and year. However, highest preference was recorded either in grassland and herbs at Keoladeo National Park and in crops grown by farmers at Ghata-Sehu, Roopbas and in fields near Padam Villa

Colony respectively. Interestingly, the modest variation in the foraging of Indian Peafowl was observed during initiation of the day and it increased during end of day (Aschoff and Wever 1962). The observations of Sathyanarayana and Veeramani 1993 showed that Indian Peafowl is herbivore and fed on green plants and crops. Hil and Robertson 1988 and Sathyanarayan 2004 observed that Indian Peafowl primarily fed on wild grass, leaves, fruits, seeds, small rodents in forest areas and also paddy, finger millet (ragi) and pearl millet (sorghum) in crop area in order of its food preference but later it fed on insects and snakes. However, John Singh and Murali 1978 studied feeding behaviour of peafowl and reported that *Pavo cristatus* are omnivorous. The findings on feeding of Indian Peafowl (*Pavo cristatus*) by support our observation Bhandary, et al., 1986; Yasmin and Yahya 1993; Yasmin 1995; Subramanian and John 2001; Van Bael, et al., 2003; Harikrishnan, et al., 2010.

**Table 1:** Foraging by Indian Peafowl, *Pavo Cristatus* in different habitat at Bharatpur 2010-11

Habitat used	Ghata-Sehu	Keoladeo National Park	Padam Villa Colony	Roopbas
Animal and insects	3.00±0.55 <sup>a</sup>	35.00±0.71 <sup>c</sup>	2.00±0.32 <sup>a</sup>	17.00±1.05 <sup>c</sup>
Crops	12.00±0.71 <sup>b</sup>	-	5.00±0.45 <sup>b</sup>	13.00±0.89 <sup>b</sup>
Fruits and Flowers	2.00±0.71 <sup>a</sup>	23.00±0.84 <sup>b</sup>	1.00±0.32 <sup>a</sup>	3.00±0.71 <sup>a</sup>
Grasses and herbs	13.00±0.71 <sup>b</sup>	43.00±2.03 <sup>d</sup>	2.00±0.55 <sup>a</sup>	14.00±0.84 <sup>b</sup>
Scrub and Trees	2.00±0.45 <sup>a</sup>	19.00±0.89 <sup>a</sup>	1.00±0.32 <sup>a</sup>	4.00±0.71 <sup>a</sup>
F and p value	1.48 df = 4, 24 p < 0.05	1.21 df = 4, 24 p < 0.05	0.71 df = 4, 24 p < 0.05	0.24 df = 4, 24 p < 0.05
LSD value	1.81	3.24	1.24	2.76

Mean values within a column with the same letter are not significantly different (ANOVA at 5% level of significance)

**Table 2:** Foraging by Indian Peafowl, *Pavo Cristatus* in different habitat at Bharatpur 2011-12

Habitat used	Ghata-Sehu	Keoladeo National Park	Padam Villa Colony	Roopbas
Animal and insects	4.00±0.71 <sup>a</sup>	39.00±1.30 <sup>c</sup>	2.00±0.45 <sup>b</sup>	17.00±0.71 <sup>b</sup>
Crops	12.00±0.71 <sup>b</sup>	-	5.00±0.84 <sup>c</sup>	19.00±1.14 <sup>c</sup>
Fruits and Flowers	3.00±0.71 <sup>a</sup>	32.00±1.41 <sup>b</sup>	1.00±0.32 <sup>a</sup>	6.00±0.71 <sup>a</sup>
Grasses and herbs	10.00±1.30 <sup>b</sup>	51.00±1.52 <sup>d</sup>	1.00±0.32 <sup>a</sup>	17.00±0.71 <sup>b</sup>
Scrub and Trees	2.00±0.55 <sup>a</sup>	28.00±1.30 <sup>a</sup>	1.00±0.32 <sup>a</sup>	5.00±0.71 <sup>a</sup>
F and p value	2.48 df = 4, 24 p < 0.05	1.92 df = 4, 24 p < 0.05	1.33 df = 4, 24 p < 0.05	1.89 df = 4, 24 p < 0.05
LSD value	2.20	3.42	1.55	1.84

Mean values within a column with the same letter are not significantly different (ANOVA at 5% level of significance)

**Table 3:** Foraging by Indian Peafowl, *Pavo Cristatus* in different habitat at Bharatpur 2012-13

Habitat used	Ghata-Sehu	Keoladeo National Park	Padam Villa Colony	Roopbas
Animal and insects	5.00±0.71 <sup>b</sup>	41.00±1.14 <sup>c</sup>	1.00±0.32 <sup>a</sup>	21.00±0.71 <sup>c</sup>
Crops	11.00±0.67 <sup>c</sup>	-	4.00±0.66 <sup>c</sup>	23.00±0.84 <sup>d</sup>
Fruits and Flowers	1.00±0.32 <sup>a</sup>	36.00±1.30 <sup>b</sup>	1.00±0.32 <sup>a</sup>	9.00±0.36 <sup>b</sup>
Grasses and herbs	9.00±0.71 <sup>c</sup>	54.00±1.30 <sup>d</sup>	2.00±0.55 <sup>b</sup>	20.00±1.23 <sup>c</sup>
Scrub and Trees	2.00±0.55 <sup>a</sup>	30.00±1.27 <sup>a</sup>	1.00±0.32 <sup>a</sup>	8.00±0.36 <sup>a</sup>
F and p value	0.39 df = 4, 24 p < 0.05	8.09 df = 4, 24 p < 0.05	3.82 df = 4, 24 p < 0.05	1.89 df = 4, 24 p < 0.05
LSD value	2.44	1.99	1.09	1.73

Mean values within a column with the same letter are not significantly different (ANOVA at 5% level of significance)

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