POPULATION INDICES AND HABITAT ASSOCIATION OF INDIAN PEAFOWL (*PAVO CRISTATUS)* IN HARYANA USING LINE TRANSECT AND CALL COUNT METHOD

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ABSTRACT

The Indian Peafowl is becoming locally extinct from several parts of its former range due to habitat conversion, changing cropping pattern, poaching and pesticide use. Due to limited detailed study on population indices of Indian Peafowl, there is no exact estimate of population density of surviving population of Indian Peafowl in the country. The aim of the present study was to know the population indices of Indian Peafowl in Ambala, Kurukshetra and Yamuna Nagar districts of Haryana using call count and line transect method. The survey was also conducted to know the various habitat variables which influence the density index of Indian Peafowl. The findings are expected to provide baseline information for developing and adopting management as well as conservation strategies for Indian Peafowl in Haryana state.

Key words: Call count, Peafowl, Habitat conversion, Population indices, Line transect, Haryana.

INTRODUCTION

Indian Peafowl (*Pavo cristatus*) is the largest of all pheasants and has been declared as the national bird of India since 1963 due to its flagship value founded on its glorious position in Indian mythology. It is believed to be widely distributed (IUCN Red List) and is fully protected under the Indian Wildlife Protection Act, 1972. In spite of the immense protection and wide distribution, the species is becoming locally extinct from several parts of its former range due to habitat conversion and changes in the cropping pattern (Imam, 2005), human interference (Shahabuddin and Kumar, 2007), poaching, and pesticide-related issues. It is likely that some well developed highly populated urban and industrial areas may not hold peafowl populations with exceptions of few pockets such as university or institutional campuses (Choudhary and Sathyakumar; 2007). In the absence of reliable information and data it is hard to predict the current status and distribution of the species (Ramesh and McGowan, 2009). Though, behavioural studies on peafowl have been carried out by Budgey (1994),

Dakin and Montgomerie, 2011 and Yasmin (2011), no detailed study on population indices of Indian Peafowl has been done so far except a questionnaire survey conducted by Choudhary and Sathyakumar (2007).

The aim of the present study was to know the population indices of Indian Peafowl in Ambala, Kurukshetra and Yamuna Nagar districts of Haryana. The survey was also conducted to know the various habitat variables which influence the density index of Indian Peafowl. Usually, encounter rates from visual or oral detections are used to estimate indices of abundance in the most of the studies of pheasants (Gaston, 1980; Ghose *et al,* 2003 and Harihar and Fernandes, 2010). The calling behaviour is very useful in the study of density index of Indian Peafowl. Male Indian peafowl emits harsh, loud call "May-awe" which can be heard up to one kilometre of area (Johnsingh and Murali, 1980; Takahashi and Hasegawa, 2008).

MATERIALS AND METHODS

Survey was conducted in District Ambala, Kurukshetra and Yamuna Nagar: The study area

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comprised agricultural fields where sugarcane, wheat and rice were the predominant crops. The district has a sub-tropical continental monsoon climate and there is seasonal rhythm of summer, winter, rainfall and great variation in temperature. The area receives an average annual rainfall of 1116 mm ranging from 716 to 1897 mm. Temperature ranges from 6-7 °C in January to 43°C during May-June.

Each district was divided into 3-4 survey sites depending upon the dominant vegetation in each area so that habitat types can be analyzed. Each site covered an area of 3-4 km. Transects of 1-2 km were laid. Three to four transects were laid in each survey site. During the line transect surveys, at the location of each flushed bird, following parameters were recorded- sex, perpendicular distance of the birds to transect, group size, distance of nearest edge, activity of bird, time of observation, microhabitat, ground cover species richness, length of transect, dominant vegetation and habitat type. Permanent call count stations were established in the study area for call counting the birds in morning hours. There was a minimum distance of 500 m between two adjacent call count points to avoid double counting of the calling birds. This distance was considered to be adequate between two adjacent observers so that possibility of missing out any calling birds between points was also reduced (Gaston, 1980). Counting of calling males was recorded on data sheets. The counts were conducted in morning hours when the birds are most active. 5-10 minutes were spent at each call count station established in the area. The counts were analyzed to generate density indices in different habitats.

At each call count session, other parameters recorded were time in field, time out of field, time of first call, time of last call, direction of call, number of calling birds, dominant vegetation and habitat type. Density and population size estimation was based upon distance sampling theory (Buckland *et. al.*, 2001) and SPSS 7.5.

Eighteen transects and twenty two call count stations were surveyed at different sites of district Ambala, Kurukshetra and Yamuna Nagar. Three to four study sites were marked in each district for survey of population indices of Indian peafowl. Variability in habitat variables was observed at different sites. Indian Peafowl were recorded in most of the survey sites except few with high human disturbance. Encounter rates vary significantly in different districts. The highest encounter rates were obtained in District Yamuna Nagar i.e. 5.6 birds/ km², whereas the lowest encounter rates were in District Kurukshetra i.e. 1.4 birds/ km² (Table 1). Majority of sightings on transects were observed in flock of 3-4 which comprised of male accompanied by number of females.

RESULTS AND DISCUSSION

Data on habitat variables was also collected at the locations of Indian Peafowl sighted on transects and call count points. There was significant difference observed among different habitat variables which influenced density of Indian Peafowl. Habitat with highest tree density exerts greater influence on habitat preference of Indian Peafowl whereas areas with litter cover were not preferred (Fig. 1). Similarly, human disturbance exerted negative influence on

TABLE 1. Density index of Indian Peafowl at various sites in Different Districts.

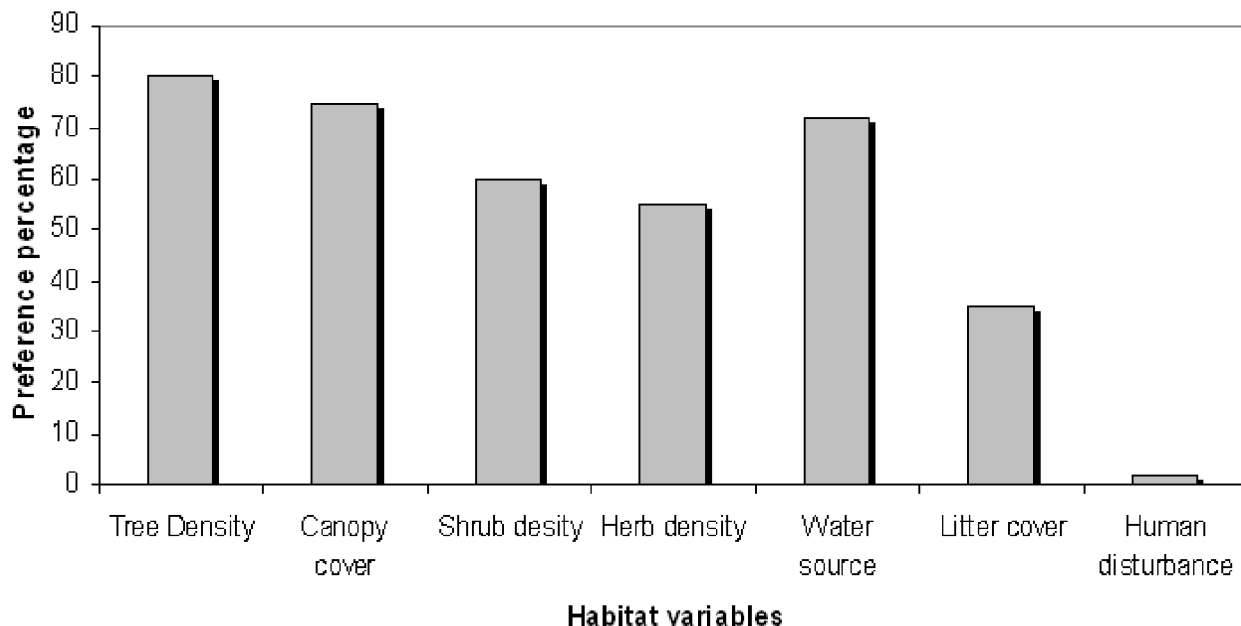| Site	District	Number of Observations	Group size	Density Index (Birds/km²)
Panjokhra	Ambala	5	4	2.6
Bulana	Ambala	3	4	1.6
Dukheri	Ambala	6	5	2.4
Gohni	Yamuna Nagar	5	4	5.6
Marupur	Yamuna Nagar	6	6	4.2
Jathlana	Yamuna Nagar	6	7	4.6
Pratapgarh	Kurukshetra	4	3	0.3
Amin	Kurukshetra	3	4	1.4
Jyotisar	Kurukshetra	5	4	0.6
Ravgarh	Kurukshetra	6	5	2.1

FIG. 1. Habitat variables preferred by Indian Peafowl

density indices of Indian Peafowl, whereas presence of water source had positive influence on density indices.

The Peafowl is a bird of scrub jungles (McGowan and Garson, 1995) and forest showing affinity to deciduous and semiarid biomes (Brickle, 2002) and also found in agricultural fields (Sathyanarayana, 2004). It prefered open areas as sites for lekking and dust bathing (Yasmin and Yahya, 1996; Harikrishnan *et al*, 2010).

The study conducted showed that areas near the human habitations did not support much population of Indian Peafowl even though it was not believed to be too shy of human presence (Brickle, 2002). The presence of water source was essential for the species and greatly influenced population density of Indian Peafowl. Thus, areas with high human interference and absence of water source had low population of Indian Peafowl. Similar results were obtained by Brickle (2002) in his studies on Green Peafowl (*Pavo muticus*) in which he stated that human settlements showed negative relationship with Green Peafowl whereas, water source show positive relationship. He also reported that there was positive relationship between number of Green Peafowl and presence of water; as water was necessary factor to maintain breeding conditions

during dry period of breeding season.

High tree density favours the survival rate of Indian Peafowl as roosting on trees with high canopy reduces risk from predators like cats, dogs, mongoose etc. Need for cover to hide and nest and large trees to roost (Subramanian and John, 2001 and Dodia, 2011) might account for preference for high tree density (Brickle, 2002). Similar results were obtained when study was conducted in district Yamuna Nagar: Areas with high tree density, more canopy cover and more woodland areas were preferably used for roosting and breeding sites.

Shrub cover decreases the chances of nest predation by ground dwelling predators, so Indian Peafowl favours high shrub cover during its breeding period (Budgey, 1994). Bird is more adapted to dense shrub, with patches of open areas as they spend most of their time in foraging, roosting and resting with other individuals. In all three districts the peafowls were observed to prefer shrubs for nesting, cover and food. Budgey, (1994) also reported that during non breeding period from December to March, Indian Peafowl took refuge in the shrubs to decrease the chances of chick mortality.

In the absence of scientific estimation of existing population size, the rate and causes of decline of population of Indian peafowl it would not

be possible to develop appropriate management and conservation strategies for Indian peafowl. Our observations on peafowl density and habitat preference in Haryana in the current scenario of depleting forest cover; changing land use and cropping pattern would provide the baseline information for conservation practices to be adopted for the species in the state.

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