



POPULATION DYNAMICS AND ABUNDANCE OF INDIAN PEA FOWL, *PAVO CRISTATUS* IN SHEKHAWATI REGION OF NORTH- EASTERN RAJASTHAN, INDIA

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Abstract

Shekhawati region is a part of Indian Thar Desert, located on the south-eastern fringes of the great Palaearctic desert. The study of demographic status and distribution pattern of Indian peafowl, *Pavo cristatus* was carried out in the Sikar, Jhunjhunu and Churu districts also known as “Shekhawati region” of Indian Thar Desert during May 2006 to November 2009. The region is situated in north-eastern part of Rajasthan and characterized by adverse climatic conditions. Line transects method (Rodger, 1988, & 91) was used to determine the population status of *Pavo cristatus* in the area. The distribution pattern of the peafowl viz. male, females, and their sub-adults were included in the counting criteria. It was observed during study that there is high mortality and low survival success rate in the study area. Though the bird species includes in least concern category of IUCN red data list but report of mass mortality in the region is indicating the decline position in peafowl numbers. Natural habitat loss due to rapid urbanization, decreasing forest area as well as use of pesticides and farming pose serious threat to peafowl in the area. Unfortunately the data of population size of the Indian Peafowl has not been quantified in districts of Shekhawati region as well as whole country. Hence, there is need for a time-bound exercise to determine the status of the species.

Key words: Shekhawati region, aid zone, Species, Indian Peafowl (*Pavo cristatus*), Population dynamics, distribution pattern, Conservation.

Introduction

The Indian blue Peafowl (*Pavo cristatus*) is a resident breeder species across the Indian subcontinent. The distribution is quite common in almost part of the country and mainly found on ground in dry, semi-desert areas, grasslands, scrublands, deciduous and open forests areas. It is a largest beautiful bird of family Phasianidae commonly known as *Mayura*, *Barhin*, *Mor*, *Nilkantha*, *Bhujangabhuk*, *Kekin*, and *Sikhavala*. The government of India awarded it with the honour of “National bird” in 1963.

The bird distributed throughout the hot regions of the arid and semi-arid zones in the country and generally roost on high trees at night. The global population size of *Pavo cristatus* has not been quantified, but the species is reported to be common to locally very common in India (**del Hoyo, J. et al., 1994**). In absence of accurate reliable demographic data, it is difficult to decide the current status of distribution and population size of the Indian peafowl (**Madge and McGowan, 2002**). In India, the population status of peafowl is not known but the species is becoming locally extinct from several parts of its former range due to habitat loss and changes in the cropping pattern (**Imam, 2005**). There is no data available related to surviving population and the rate of loss from the entire country. Recently few years back some states like Himachal Pradesh, Uttarakhand and Gujarat have initiated statewide surveys for these birds. The responses from Civil Society members indicate that the Indian peafowl population outside protected areas and forest land areas may be about 11, 69, 000 in M.P., 1, 82,000 in Orissa, 77,000 in Tamil Nadu and about 91, 000 in Uttar Pradesh. All of the above add up to an estimate of about 15, 35, 000 Indian peafowl outside protected areas and forest land areas (**Choudhury and Sathyakumar, 2007**). However, such estimates have to be treated as guess estimates only.

The WII made a Questionnaire Survey in protected areas (forest land) during the year 2004. In addition to this; another survey was conducted during 2006 in non-protected areas (revenue lands, agricultural lands, and private lands) through a networking approach to find out the present status of the Indian Peafowl. The Indian Peafowl populations are reported to be present in 193 PAs, 19 other forest land areas, and 141 revenue land areas. Of the total 353 localities that have reported Indian Peafowl presence, the population estimates are available for 195 localities only. The total population estimated within the 195 localities is over 15, 00,000 birds. This estimate reflects only the minimum population size (**Ramesh and McGown, 2009**). Peafowl population estimate could also be derived from the recently concluded tiger population estimation project, which gathered data on peafowl numbers as a part of prey estimation (**Jhala et al., 2005**). However this project was mostly carried out in the forest areas of tiger habitat and thus covered only a small portion of actual peafowl habitats. In Rajasthan a survey was conducted by Rajasthan Patrika on January 10, 2008 but the data are not good enough to reach any conclusion for the state.

Because of enough food supply at grassland or crop field, population of the peafowl is found high at agriculture farms (**Sharma, 1973**). The variation in group size is considered as a part of ‘species adaptation’ to its environment (**Southwell, 1984**). The variation in group size could be due to habitat structure, spatio-temporal distribution of food and predation pressure (**Barrette, 1991**). The group size of blue peafowl varies due to habitat structure and spatial distribution of food (**Trivedi, 1993**). *Pavo cristatus* is found solitary or in small parties, several females with one or more males around human population (**Grewal, 1995**). A significant seasonal variation in group size between ‘close’ and ‘open’ habitats has been observed (**Yasmin, 1995**). Though, compilation of these data would be helpful to understand the demographic structure in a particular area but such efforts are not sufficient for large regions of the country like India.

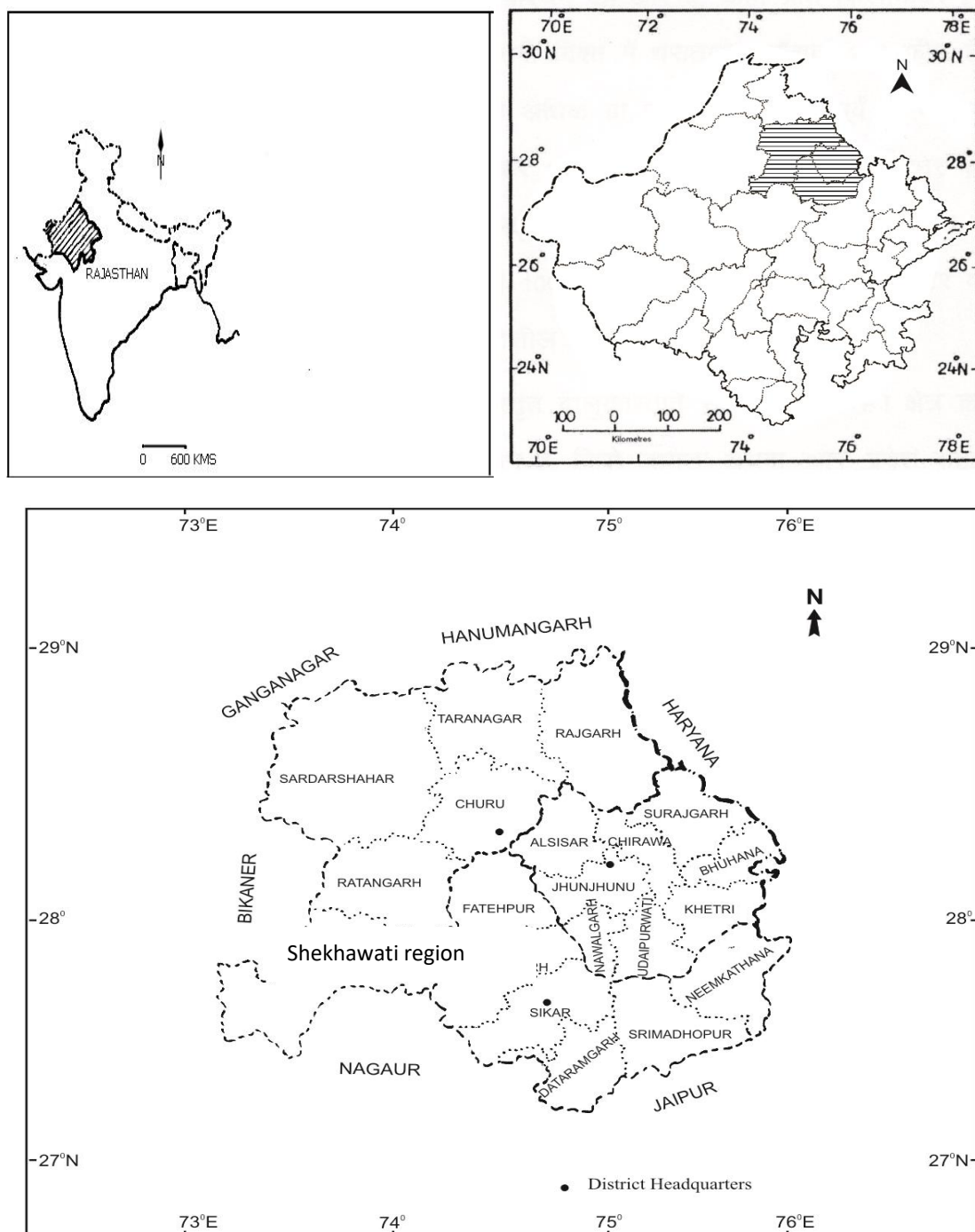
Study area

The Shekhawati region of Indian Thar desert, located in the north-east part of Rajasthan lies in between 27°24' to 29° 02' N latitude and 73°4' to 76° 5' E longitude at a height of about 320 meters from sea level. The area comprises of three districts namely Jhunjhunu, Sikar and Churu and covers an area of 27,529.44 sq km. The region is not a vast stretch of sand dunes but also with mountainary range of Aravalli, interspersed with low hills and gravel plains. The south-eastern part of the region is semi-desertic type with many hillocks and mountainary range of Aravalli and plains in Sikar and Jhunjhunu districts while the north-west part of it is totally desertic type, covered with thick layer of sand dunes. Due to high wind velocity, during summer, sand shifts from one place to another resulting in dust storms. Cross winds, dust and sand storms are common in the area which results in annual changes in the topography of the sandy habitats (**Joshi and Sharma, 1964**). The population density of Shekhawati districts is higher than the most of other Thar

districts. Except Tal Chhapar sanctuary, there is no wildlife protected area in the region. The extreme type of climatic conditions is characterized by diurnal, seasonal and annual fluctuations of temperature, humidity and rainfall which play an important role for survival of wild fauna here. Cold waves in winter (January and February) and sand storms in summer (May and June) are frequent. Inspite of harsh climatic conditions, diversity of fauna and flora the region is spectacular.

The study area is not rich in Galliformes species. Out of 45 Indian Galliformes species, only 7 are observed in this region. Of them four are Quils, two are Francolins and one is Pheasant species. The pheasant species found here is Indian Peafowl (*Pavo cristatus*) that is very common in Shekhawati districts.

Fig. 1 Study area



Material and method

A survey was done during 2006 to 2009 in Shekhawati region to estimate the current status and distribution pattern of peafowl population. The present status of *Pavo cristatus* population in the region has been carried out first time in region by line transects method (**Rodgers, 1988, 1991**). For this, plots of 1x1 square kilometer area were randomly selected in villages, cities, near cities, open forests, cultivated and non cultivated fields and orchards in the region. Total 205 transects (one sq km. each) were randomly selected from different location in different seasons in the study area. Peafowls were counted randomly anytime between dawn to dusk to avoid biasness of selecting only roosting sites. Weekly counts were made throughout the study area. The location of the bird was marked on map and direction of flight was recorded in case the bird flew away. Number, sex and age class were recorded. All the members of peafowl (male/female/juvenile/hatchling) were counted. The Variations in group size of *Pavo cristatus* were studied in different seasons and Group sizes were categorized into three classes: single, two to four and more than four.

Fig. 2 group composition of *Pavo cristatus* in study area



Result and discussion

It has been observed that peafowls are not equally distributed in Shekhawati region. A large number of peafowl can be seen near villages and water bodies in hot and winter days but during rainy season they move to cultivated field because of easy availability of water and food material in the form of saplings. The

areas where both Kharif and Rabi crops grow, the peafowl feed in field and roost on long trees near human population. The peafowl were observed in less number in forest and open uncultivated areas, far from human population.

Total 265 *Pavo cristatus* were found in all the selected transacts (Table 1). In this way the average population of *Pavo cristatus* in the study area is 1.29 per square km. The Shekhawati region covers near about 27529.44 sq. km. area and total population of *Pavo cristatus* in the area is approximately 35512. The counting was done randomly during any time from dawn to dusk. The species is very timid and shy, and is protected under Wildlife (Protection) Act, 1972; tagging or marking was not done.

Total of 5100 peafowls were observed for the grouping pattern study. There were no specific criteria of grouping in the species. The analysis of data regarding group size indicates that *Pavo cristatus* are found in group of single, two, three, four and more. In summer season 30.41% peafowls were observed in groups of single, 59.47% were in group of 2-4 and 10.11% were in group of more than four (Table 1). In winter season 22.23% peafowls were observed in groups of single, 67.17% were in group of 2-4 and 10.58% were in group of more than four (Table 1). In rainy season single groups were 14.58% were single, 61.05 were in the groups of and rest 24.35% were in more than four in number.

The male *Pavo cristatus* were more than the female in group of single (62%). Most of single groups were seen near human habitation than in open forest or field. But in rainy season more of them were found near cultivated fields. In 2-4 groups, the ratio of male and female was 1:1.6 and in group of more than four, the ratio was 1:2.1 (females were more than males). More than 80% peafowls in last two groups (2-4 and more than 4) were seen near human habitation and its surroundings in summer and winter seasons but in rainy season they moved to cultivated fields. The studies reveal that females always have a tendency to live in groups. In rainy season, which happen to be its breeding season, the group size of more than increases significantly due to breeding activities.

Table 1. Group composition of *Pavo cristatus* in Shekhawati region

Season	Group Size					
	Single	%	Two to four	%	More than four	%
Summer	517	30.41	1011	59.47	172	10.11
Winter	378	22.23	1142	67.17	180	10.58
Rainy	248	14.58	1238	61.05	214	24.35
Total	1143	22.41	3394	62.56	566	15.01

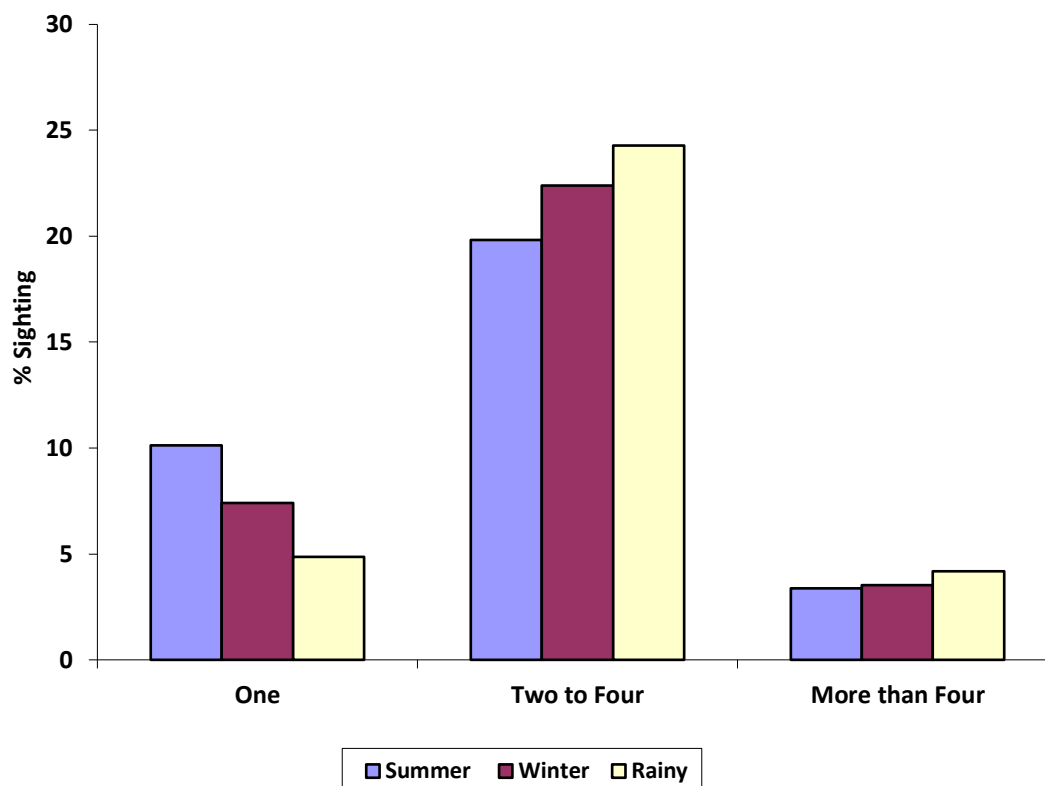


Figure 3. Group size of *Pavo cristatus* in Shekhawati region

Conclusions

Though Indian peafowl is classified as Least Concerned (LC) category in the IUCN Red Data List (2012) yet the species has been provided the highest degree of legal protection in India under the Wildlife (Protection) Act 1972, having been placed in Schedule I of the wildlife protection Act.

However, in recent years several cases of the mortality of peafowl have been reported from certain parts of the country. The matter is certainly of serious concern, especially because it relates to the National Bird, which also plays an important ecological role by feeding on insects and pests, thereby maintaining a balance in nature as well as aiding in agriculture practices. Hence, it is essential that all necessary steps should be taken to protect the peafowl wherever it is found and also to examine the cases of mortality very carefully, with a view to determine the root causes and to take prompt and effective measures to address the problem. Needless to add that in any case of killing or poaching, the case must be investigated quickly and the culprits prosecuted under the relevant legal provisions, with proper follow up in the court to ensure that a stringent penalty is imposed on the wrongdoers. It is also necessary to take note of the concern that the mortality of the birds is caused by the intake of pesticides used in agricultural operations. This can be determined in each case by conducting a proper post-mortem of the carcasses immediately after the incident. If it is established that pesticides are indeed the cause of mortality, it is essential to take the help of the Agriculture Department to create awareness among the farmers about the ill effects of such pesticides and to build support for the use of more benign pesticides, including bio-pesticides, for which some efforts are being made through the good offices of the Ministry of Agriculture. The need for an awareness campaign is self-evident to make the people aware of the fact that the Peafowl is the National Bird and its killing is a serious offence for which no one will be spared. Relevant publicity material on the subject has to be prepared and disseminated widely and the assistance of the local press should also be enlisted to spread the words. Though the species has no major predators near human habitations and crop fields, feral dogs had been observed killing and feeding on the species. Feral dog population is not only threat to this species but almost all avian species in the region. The population of feral dogs should be kept in control so that they do not become menace to our feathered friends.

It is clearly evident from the earlier studies also, that there is an urgent need to obtain basic information on Indian Peafowl presence/absence, encounter rates and population estimates from the PAs, outside PAs, including revenue and private lands for the better management of the National Bird. It appears that substantial portions of Indian Peafowl distribution range and populations are outside the PA network or forest land areas. The intensive field sampling data of the current status of peafowl population are not available for the whole country, without which it is not easy to draw a general conclusion.

References

1. Barrette, C. 1991. The size of the Axis deer fluid group in Wilpattu National Park, Sri Lanka. *Mammals*, 55(2): 207-220.
2. Choudhary, B. C. and Sathyakumar, S. 2007. Current status of the Indian Peafowl. MOR, *Newsletter of World Pheasant Association*, India. 1-7.
3. Choudhary, B. C., Sathyakumar, S. and Christi, S. 2007. An Assessment of the Current status of the Indian Peafowl (*Pavo cristatus*) in India based on Questionnaire surveys. *Galliformes of India*, Vol.10, (1): 53-60.
4. Del Hoyo, J., Elliot, A. and Sargatal, J. 1994. *Handbook of the Birds of the World*. New World Vultures to Guineafowl – Vol. 2. Lynx Edicions, Barcelona. 434-552.
5. Grewal, B. 1995. *Sanctuary Nature Guide to Birds of the Indian Subcontinent*. Guidebook Company Limited, Hong Kong. 35.
6. Imam, E. 2005. Population status and conservation of Indian Peafowl, *Pavo cristatus* in Aligarh, northern India. In: (Eds. R.A. Fuller and S. J. Browne). *Galliformes*. Proceeding of the 3rd international Galliformes symposium. World Pheasant Association, Fordingbridge, United Kingdom.
7. Jhala, Y. V., Qureshi, Q. and Gopal, R. 2005. Monitoring Tiger, Co-predators, Prey and Their Habitat. Technical publication of Project Tiger Directorate, New Delhi and Wildlife Institute of India, Dehradun, pp 55.
8. Joshi, M. C. and Sharma, B. S. R. 1964. Study of grasses & Sedges of certain areas in Jhunjhunu district, Rajasthan. Proceeding of the symposium on problems of Indian arid zone Jodhpur (23rd Nov. to 2nd Dec.). 217-221.
9. Madge, S. and McGowan, P.J.K. 2002. *Pheasants, Partridges and Grouse: A Guide to the Pheasants, Partridges, Quails, Grouse, Guineafowl, Buttonquails and Sandgrouse of the world*. Christopher Helm, London.
10. Ramesh K. and McGowan, P. 2009. On the current status of Indian peafowl, *Pavo cristatus*: keeping the common species common. *Journal of Threatened Taxa*, 1 (2): 106 - 108.
11. Rodgers, W.A. (1988). A field manual of technique for wildlife Census in India, WII, Dehradun.
12. Rodgers, W. A. 1991. Techniques for Wildlife Census in India: A field manual. Wildlife Institute of India, Dehradun.
13. Sharma, I. K. 1973. Ecological studies of Biomass of the Peafowl (*Pavo cristatus*). *Japanese Journal of Ornithology*, Vol. 22(93-94): 25 - 29.
14. Southwell, C. J. 1984. Variability in grouping in the eastern grey kangaroo, *Macropus giganteus*, group density and group size. *Aust. Wild. Res*, 11: 423-435.
15. Trivedi, P. 1993. Habitat selection by Indian peafowl (*Pavo cristatus* linn.) in Gir Forest. M.Sc. Dissertation, Saurashtra University (unpublished), pp 36.
16. Yasmin, S. 1995. Ecology and Biology of the Indian Peafowl, *Pavo cristatus* in the Aligarh Region. (BUCEROS, *ENVIS Newsletter: Avian ecology and inland wetlands*, Vol. 1, Nos. 1, Sep. to Dec. 2002. Summaries of Ph.D. Thesis on birds, Bombay Natural History Society, 2001, 35 - 37).