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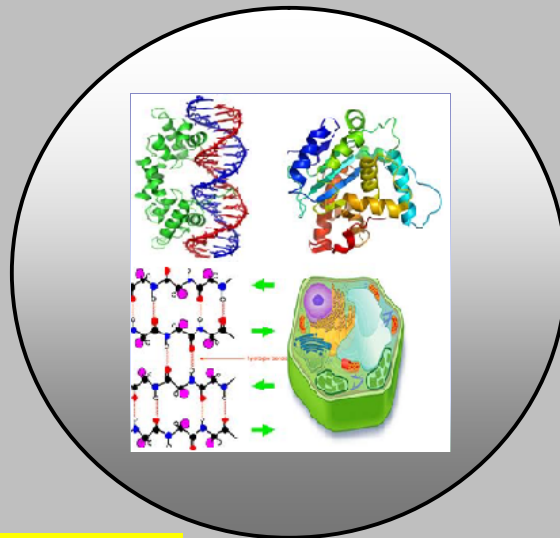
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RESEARCH PAPER

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A Study of Muster Size and Composition of Blue Peafowl, *Pavo cristatus* L. in District Kurukshetra, Haryana (India)

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ABSTRACT

The present investigation was made to record the muster size and composition of blue peafowl in Saraswati plantation wildlife sanctuary (SPWS) in district Kurukshetra, Haryana (INDIA) from August, 2008 to September, 2010. Scan sampling method (Altman, 1974) was followed for the present study. The results revealed no significant seasonal variations in muster size of peafowl. However, seasonal variations in the muster composition were observed. Six type of musters were recorded which included, All Male (AM), „All Female (AF), Male-Female mixed (MF Mxd), Female-Sub-adult mixed (FSu Mxd), Female-Chick mixed (FC Mxd) and Male-Female-Sub-adult mixed musters (MFSu Mxd) with muster size ranging between 2-8, 2-12, 4-8, 2-12, 3-7 and 6-11 respectively. All Male musters (AM), All Female (AF) musters, Female-sub adult mixed (FSu Mxd) musters and Female-Chicks mixed (FC Mxd) musters were randomly observed throughout the year, whereas, Male-Female mixed musters (MF Mxd) and Male-Female-sub adult mixed (MFSu Mxd) musters were sighted only during the breeding season of the peafowl.

Keywords: Blue peafowl, Muster size, Muster Composition, SPWS.

INTRODUCTION

Birds are the most remarkable of all living organisms, the creatures of astounding abilities that elude our understanding, of extraordinary, even bizarre senses, of stamina and endurance for surpassing anything else in the animal world (Fisher, 1979). Birds originated more than 150 million years ago from bipedal reptilian ancestors (Theropod dinosaurs) in the Jurassic period of the Mesozoic era. The avian diversity of the world is noted for its remarkable variation in features and number depending upon the zoo-geographical, climatic and physiographic conditions.

For this reason, understanding their ecology may enhance our understanding of biology and behavior of birds and help to devise their conservational strategies (Butchart, 2009).

Peacock is probably the oldest known ornamental bird. "Muster" is a particular term used for flock of peafowls (Irving and Simon, 1961, Grzimek, 1972). Group formation has been observed in many bird species and the possible causes and functions of grouping have gained much attention over the years (Caraco *et al.*, 1980). 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). In Haryana, *Pavo cristatus* is mainly distributed in Sultanpur National Park (Gurgaon), Kalesar National Park (Yamunanagar), Saraswati Plantation Wildlife Sanctuary (Kurukshetra) and in other districts such as Faridabad, Hisar, Jind and Mahendergarh. Studies related to ecology and behaviour of blue peafowl are lacking in this region. Therefore, present study was conducted on the muster size and composition of common peafowl (*Pavo cristatus*) from August, 2008 to September, 2010 at Saraswati plantation wildlife sanctuary (SPWS) in district Kurukshetra, Haryana (India).

MATERIAL AND METHODS

During the present study, scan sampling method (Altman, 1974) was followed to record the muster size and composition of blue peafowl in Saraswati plantation wildlife sanctuary (SPWS) in district Kurukshetra, Haryana (INDIA) from August, 2008 to September, 2010 (Fig 1). Periodic monthly visits were conducted to the study site. The diurnal period of the day was divided into three phases (*i.e.*, morning phase from 6:00 AM – 11.00 AM, noon phase from 11:00 AM – 3:00 PM and evening phase from 3:00 PM – 6:00 PM). The study site was thoroughly scanned on feet with a steady pace on predetermined transects to record muster size and composition of blue peafowl. Following (Arcese *et al.* 1995) six types (Table 1) of musters of blue peafowl were recognized during the periodic monthly visits and number of individuals per muster was recorded. During the study, two musters were considered distinct if they had been separated by a distance greater than greatest width of either of the units as seen from the transect position following (Barette, 1991). Mean muster size was also calculated.

RESULTS AND DISCUSSION

During the present study, the number of muster sightings varied from 2-7 musters/visit. In all, six types of musters were recorded which included, All Male, All Female, Male- Female mixed, Female-Sub-adult mixed, Female-Chick mixed and Male-Female-Sub-adult mixed musters (MFSu Mxd). All Male, All Female, Male-Female mixed, Female-Sub-adult mixed, Female-Chick mixed and Male-Female-Sub-adult mixed muster size ranged between 2-8, 2-12, 4-8, 2-12, 3-7 and 6-11 respectively (Plate 1). No significant seasonal variation has been reported in muster size of peafowl during the present study.

However, seasonal variations in the group composition were observed (Table 2) thereby confirming the earlier findings of (Yasmin, 1994). Out of total 105 musters sighted during the present study (Table 2), 16, 13, 12, 16 musters of variable size were observed during autumn, winter, summer and monsoon seasons respectively during the year 2008-09 and 12, 7, 13 and 16 musters were observed during autumn, winter, summer and monsoon seasons respectively during the year 2009-10 (Figs. 2 and 3). These included 22% All Male musters, 24% All Female musters and 54% different categories of Mixed musters, namely, Male-Female mixed musters, Female-Sub-adult mixed musters, Female-Chick mixed musters and Male-Female-Sub-adult mixed musters (Fig. 3 and 4). Out of 22% All Male (AM) musters, maximum 7 musters were observed each in autumn and winter followed by 6 in monsoon and 5 in summer season. All Male (AM) muster size ranged between 2-8 (Table 3). All Female (AF) musters were sighted up to 2 times/ visit. 24% All Female (AF) musters sightings included 6 sightings in autumn, 4 sightings in winter, 8 sightings in summer and 5 sightings in monsoon season. Muster size of all Female (AF) musters ranged between 2-12 (Table 3). As far as mixed (Mxd) musters were concerned, 15, 9, 12, 21 mixed (Mxd) musters were observed in autumn, winter, summer and monsoon seasons respectively. In autumn season, of the 15 mixed (Mxd) musters sighted, 1, 6, 6 and 2 were Male-Female mixed (MF Mxd), Female-sub adult mixed (FSu Mxd), Female-Chicks mixed (FC Mxd) musters and Male-Female-sub adult mixed (MFSu Mxd) musters respectively. Similarly, in winter season, 9 mixed (Mxd) musters were sighted which included 4 Female-sub adult mixed (FSu Mxd), 4 Female-Chicks mixed (FC Mxd) and 1 Male-Female-Sub adult mixed (MFSu Mxd) musters. In summer season, 12 sighted Mxd musters constituted of 7 MF Mxd, 4 FSu Mxd, and 1 male-female-sub adult mixed (MFSu Mxd) musters. Similarly, during monsoon season, a total of 21 mixed (Mxd) musters were sighted which included 8 Male-Female mixed (MF Mxd), 6 Female-sub adult mixed (FSu Mxd), 4 Female-Chicks mixed (FC Mxd) and 3 Male-Female-Sub adult mixed (MFSu Mxd) musters (Table 3). Male-female mixed (MF Mxd) musters sightings were found dominating only during the breeding season of peafowl, *i.e.*, during the months of April to August in the study area. Male-female mixed (MF Mxd) muster size ranged between 4-8 peafowls /muster (Table 3). The largest size of 3 males and 5 females was sighted in the month of July, 2010 (Table 2).

Total 35% Female-sub adult mixed (FSu Mxd) musters were sighted throughout the year during the study period. Maximum 6 musters were seen each in autumn and monsoon seasons followed by 4 each in winter and summer seasons. The musters size ranged between 2-12 (Table 3). The largest Female-sub adult mixed (FSu Mxd) musters was sighted which included 4 females and 8 sub adults in SPWS during the autumn season (Table 2). In all, 25% Female-Chicks mixed (FC Mxd) musters were observed during the study period, which included 6 in autumn, 4 in winter and 4 in monsoon season. The range of Female-Chicks mixed (FC Mxd) muster size was 3-7. The largest Female-Chicks mixed (FC Mxd) muster was composed of 1 female and 6 chicks (Table 3).

7 Male-Female-Sub adult mixed (MFSu Mxd) muster were observed throughout the study. These were seen in autumn, winter, summer and monsoon seasons in 2, 1, 1, and 3 numbers respectively. The size of Male-Female-Sub adult mixed (MFSu Mxd) musters varied from 6-11 peafowls/MFSu Mxd muster (Table 3). The largest Male-Female-Sub adult mixed muster (MFSu Mxd) was composed of 4 males, 5 females and 2 sub adult peafowls (Table 2). All Male musters (AM), All Female (AF) musters, Female-sub adult mixed (FSu Mxd) musters and Female-Chicks mixed (FC Mxd) musters were randomly observed throughout the year, whereas, Male-Female mixed musters (MF Mxd) and Male-Female-sub adult mixed (MFSu Mxd) musters were sighted only during the breeding season of the peafowl (Tables 2). (Yasmin, 1994) and (Harikrishanan, 2006) have earlier reported that the solitary males were more often sighted from April to June. However, in the present study, solitary males were observed throughout the year but more frequently in the summer season, *i.e.*, March to May. During the month of April, sub adult males stayed with the adult females in the groups of 2-13, while in the month of May, groups of Females and sub-adult males become rare and solitary females were seen more often confirming the earlier findings of (Harikrishanan, 2006). The probable reason might be that the females formed their nests during this period and consequently sub adults got segregated from the groups.

Table 1. Muster composition of blue peafowl (following Arcese *et al.*, 1995).

S. No.	Type of muster	Characteristics
1.	All Male muster (AM)	All individuals in the muster included adult males.
2.	All Female muster (AF)	All individuals in the muster included adult females.
3.	Male-Female mixed muster (MF Mxd)	Muster included adult male(s) and adult female(s).
4.	Female-Sub adult mixed muster (FSu Mxd)	Muster included adult female(s) and sub adults.
5.	Female-Chicks mixed muster (FC Mxd)	Muster included adult female and chick(s).
6.	Male-Female-Sub adult mixed muster (MFSu Mxd)	Muster included adult male(s), adult female(s) and Sub adults.

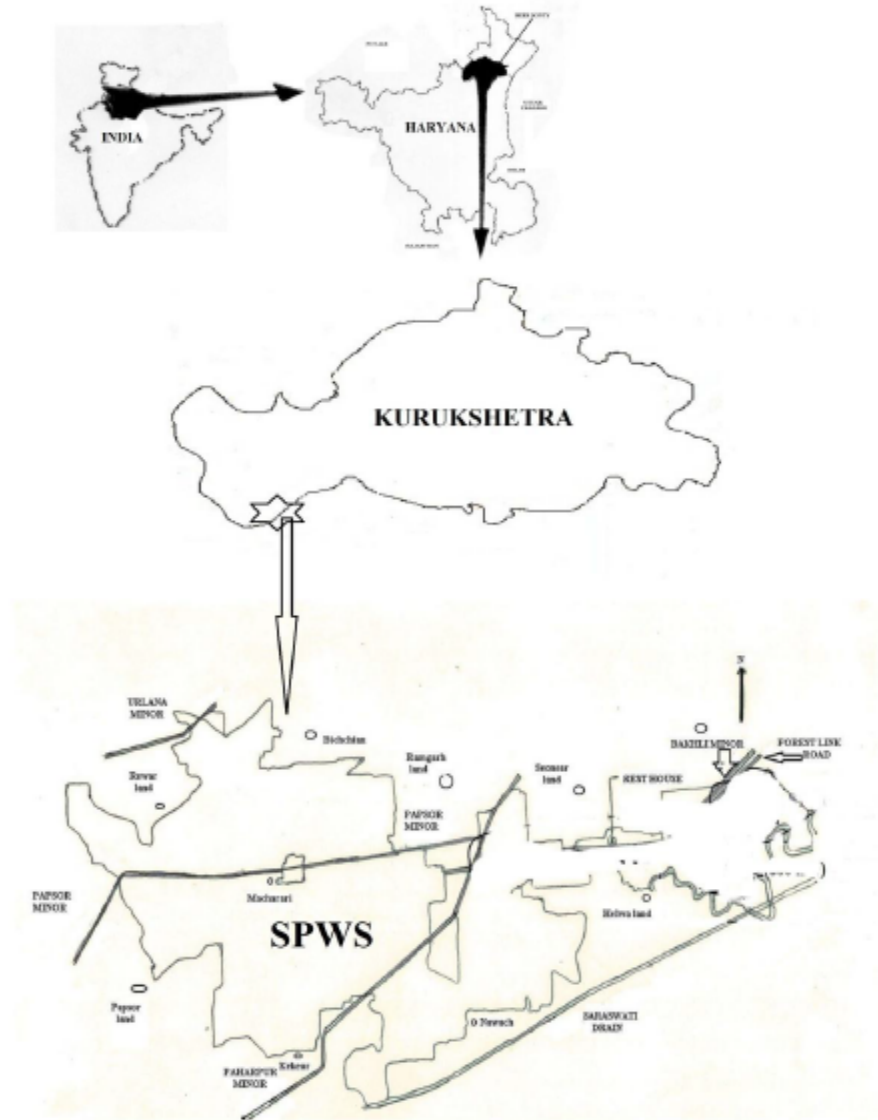


Figure 1. Map showing the location of Saraswati Plantation Wildlife Sanctuary in District Kurukshetra, Haryana (India).

Table 2. Muster size and composition of peafowl in SPWS during 2008- 2010.

Months	Muster size and muster composition/ sighting						
	I	II	III	IV	V	VI	VII
Sep. 08	2(2m)	2(2m)	6 (1f+5c)	12 (4f+8su)	8(2m+3f+su)	5 (1f+4c)	-
Sep. 09	6 (3m+3f)	8(4f+4su)	9(5m+2f+2su)	5 (5m)		-	-
Oct. 08	6 (6m)	9 (4f+5su)	4 (4f)	7 (7m)	6 (1f+5)	-	-
Oct. 09	4(4m)	5(1f+4c)	3(3f)	6(2f+4su)	3(3f)	-	-
Nov. 08	9(4f+5su)	5 (1f+4c)	6 (1f+5c)	2 (2f)	12 (12f)	-	-
Nov. 09	2(2m)	4(4f)	5(1f+4su)	-	-	-	-
Dec. 08	6 (6f)	8 (3f+5su)	4(1f+3c)	6(6m)	4 (4m)	-	-
Dec. 09	3(1f+2c)	5(3f+2su)	6(1f+5c)	-	-	-	-
Jan. 09	3(3m)	2(2f)	-	-	-	-	-
Jan. 10	7(3f+4su)	4(4m)	-	-	-	-	-
Feb. 09	8 (8m)	3(3m)	2 (2m)	6(3f+3su)	4(3f+1c)	4 (4f)	-
Feb. 10	4(4f)	9(2m+2f+5su)	-	-	-	-	-
Mar. 09	6 (2f+4su)	4(4f)	3(3m)	-	-	-	-
Mar. 10	5(5m)	5(2f+3su)	2(2f)	3(3f)	-	-	-
Apr. 09	4(2f+2su)	2(2f)	5(1m+4f)	3(3f)	5(2m+3)	2(2m)	-
Apr. 10	3(3f)	6(6m)	3(1m+2f)	5(3f+2su)	2(2f)	-	-
May 09	5(1m+4f)	7(3m+4f)	2(2m)	-	-	-	-
May 10	5(2m+3f)	11(4m+5f+2s)	5(5f)	7(2m+5f)	-	-	-
Jun. 09	2(2f)	8(3m+5f)	6(1m+3f+2su)	7(1m+3f+3su)	-	-	-
Jun. 10	4(2m+2f)	3(3m)	7(1m+3f+2su)	6(3m+3f)	-	-	-
Jul. 09	4 (4f)	3(1f+2su)	6 (3m+3f)	2(2f)	2(2m)	9(4f+5su)	2(2m)
Jul. 10	5 (1m+4f)	2(2f)	8(3m+5f)	4(4f)	4(2f+2s)	5(1m+4f)	-
Aug. 09	2(2m)	4 (4m)	4(1f+3c)	7 (1f +6c)	10(3f+7s)	-	-
Aug. 10	4(1f+3c)	4 (2m+2f)	4(1f+3c)	7 (2f +5su)	7 (7m)	2(1f+1su)	-

*Figures in parentheses represent muster composition. m- Adult male, f- Adult female, su- Sub adult, c- Chick.

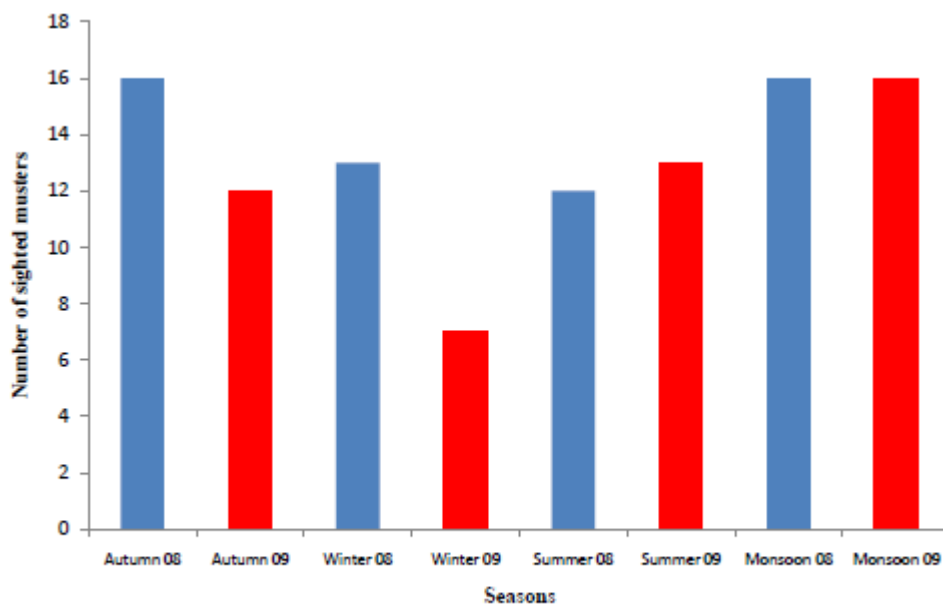


Fig 2. Seasonal variations in muster sightings in SPWS during 2008 -2010.



Fig. 3. Seasonal variations in the types of musters seen in SPWS during 2008-2010.

Table 3. Muster sightings, their range and mean muster size ± S.E. in different seasons in SPWS.

Muster type		Autumn	Winter	Summer	Monsoon
	Total	7	7	5	6
AM	Range	2-7	2-8	2-6	2-7
	Mean±S.E	4.00±.78	4.28±.77	3.83±.70	3.33±.80
AF	Total	6	4	8	5
	Range	2-12	3-6	2-5	2-4
	Mean±S.E	4.66±1.49	4.00±.81	2.71±.28	2.80±.48
MF Mxd	Total	1	-	7	8
	Range	6	-	3-7	4-8
	Mean±S.E	8±0.00	-	5.28±.52	5.75±.55
FSu Mxd	Total	6	4	4	6
	Range	5-12	5-8	4-6	2-10
	Mean±S.E	8.16±1.01	6.50±.64	5.00±.40	5.83±1.35
FC Mxd	Total	6	4	-	4
	Range	5-6	3-6	-	4-7
	Mean±S.E	5.33±.21	4.25±.62	-	4.75±.75
MFSu Mxd	Total	2	1	1	3
	Range	8-9	9	11	6-7
	Mean±S.E	8.5±.50	9.0±0.00	11.0±0.00	6.6±.33

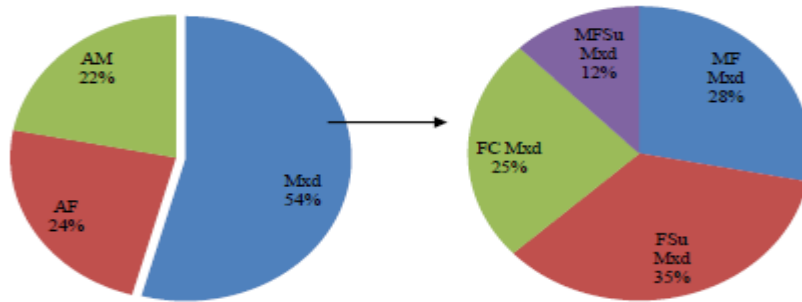


Fig. 4. Percentage of different types of musters sighted during the study period in SPWS.



(a)



(b)



(c)



(d)

Plate 1 shows (a) All Male muster (b) All Female muster (c) Male-Female-Sub-adult mixed muster (d) Female-Chick mixed muster.

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