



Research Article

SEASONAL VARIATION IN POPULATION AND GROUP SIZE OF BLACK FRANCOLIN *FRANCOLINUS FRANCOLINUS* IN MANDAL VALLEY, GARHWAL HIMALAYA, INDIA

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ABSTRACT

The present study was conducted from January 2019 to December 2019, seasonal variation in population and group size of Black francolin *Francolinus francolinus* in Mandal valley, Garhwal Himalaya, India. A total 271 birds with 173 groups and 169 sightings, overall individuals per sighting, average group size and largest group across the season were recorded 1.67 ± 0.27 , 1.49 ± 0.31 and 2.43 ± 0.44 respectively. Significant variation was also observed in population and group size. Maximum values of individuals per sighting, group size and the largest group were recorded during the winter season while the minimum for the same was recorded during the summer season.

Keywords: Population, Seasonal Variation, Garhwal Himalaya, Black francolin.

INTRODUCTION

Black francolin *Francolinus francolinus* is one of the most common birds of open, sparsely covered, cultivated field's hillsides. It belongs to order Galliformes and family Phasianidae. It has been introduced as a sporting bird in many countries like USA, Canada, New Zealand, South Africa (Galbreath & Moreland, 1953; Molini & Christensen, 1976). In the Indian sub-continent, Black francolins have been reported (Ali & Ripley, 1983; Kukreti, 2017). In the hills of Garhwal Himalaya, Black francolin is a common sport bird and also considered as pest species because of its close association to the crop fields and feeding habits on young sprouting seeds of wheat and barley crops (Pal *et al.*, 2016). Till date, no attempt is made to conserve and manage this bird. Our knowledge on its distribution, ecology, breeding biology and behavior is varying scanty (Baker, 1928; Johnsgard, 1973; Kukreti, 2017). Present communication deals with adequate information on the sightings, population, seasonal variation and group size of Black francolin from Garhwal Himalaya, Uttarakhand.

MATERIAL AND METHODS

Intensive study was carried out on residential populations of Black francolin in wild for one year (January 2019 to

December 2019) at Mandal valley, district Chamoli, Garhwal Himalaya. The study site lies between 1660 and 1950 meters altitude on North-East facing slope. The study site lies comprised of mixed temperate forest of *Quaricus*, *Rhododendron*, *Myrica*, *Cedrus*, etc. The maximum and minimum temperature varies from 10.2°C to 23.8°C and 4.2°C to 15.8°C respectively from January to June and July to December. During the study period, regular visits for 8-10 days were made every month to record information on sightings, group size and seasonal variation of Black francolin. Using Transect/trail walks method (Javed & Kaul, 2002), data were collected on total number of francolin sighted, number of groups, the maximum number of individuals in a group, biotic pressure etc. In the study site, many trails were laid by local people who daily visit the area to fodder and fuel collection, cattle grazing etc. Data were analyzed statistically using 't' test and one way ANOVA (Yates & Mather, 1963).

RESULTS AND DISCUSSION

Black francolin is a social bird, live in a group of 3-4. During winter months (November to January), several groups unit and form large coveys. Details of sightings are

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presented in Table 1. During the study period (January 2019 to December 2019), 271 birds were recorded in 169 sightings. The overall 1.67 ± 0.27 birds were sighted in single sighting (range from 1.00 ± 0.06 to 2.17 ± 0.53). Population size was found low from March to June but a significant increase was observed by the month September and attained maximum size in December (2.17 ± 0.53 individuals/sighting). Thereafter, a decline in population was noticed. The group size was recorded low from March to July followed by an increasing trend from September onwards and attained maximum size in January 2.01 ± 0.46 . The overall size of the largest group was 2.43 ± 0.44 (ranged from 1.87 ± 0.24 in April to 3.32 ± 0.87 in December 2019).

Records of sighting also showed seasonal variation (Table 2). In the winter season, overall 2.28 ± 0.47 individuals per sighting recorded. During the spring season, 1.41 ± 0.18 individuals recorded per sighting. In summer season overall 1.30 ± 0.12 individual/sighting recorded. During Monsoon and post monsoon season, 1.70 ± 0.32 individuals/sighting observed. Seasonal variation was also noticed in mean group size and largest group size. In winter, spring, summer and monsoon and post monsoon, the group size was recorded 1.88 ± 0.35 , 1.31 ± 0.15 , 1.20 ± 0.08 and 1.58 ± 0.17 respectively. The largest group size 3.12 ± 0.68 recorded in winter season while the smallest group comprising 2.02 ± 0.30 individuals was observed in the summer season. The Black francolin inhabits open ground dotted with scrub jungle along the coast close to cultivated land. Records on sightings of Black francolin collected for one year (January 2019 to December 2019) in Mandal valley, Garhwal Himalaya, Uttarakhand show seasonal variation. During monsoon and post monsoon and

winter seasons (June to January). Both population and group size were found quite high while a decline was recorded in spring.

Seasonal variation in population and group size could be due to the biological and environmental factors. The small population and group size were recorded during spring and breeding seasons (from February to April). This could be due to reproductive behavior or predation. Black francolin breeding starts during March onwards (Ali & Ripley, 1983; Kukreti, 2017) when pair formation between adult male and female takes place. For making territory, birds disperse in habitat. After egg laying females also become busy in the incubation of eggs on her nests. As a result, sightings of birds reduced during this period, since hunting activity was never observed in our intensive study site. During the monsoon and post monsoon period (July to October), the high number of individuals and large group could be due to merging of small coveys with newly hatched juveniles. Among the environmental factors, rainfall associates with growth of the vegetation, grains (in the form of Kharif crops, rice, millets, pulses etc.), grass, seeds and insect population. Therefore, abundant food supply attracts all individuals of population and formation of the larger coveys' stakes place as reported in other game species. In Black francolin (Kukreti *et al.*, 2016), Gray francolin (Priscilla & Jasmine, 2002). Flocking also coincides with abundant food supply during post monsoon time. During the winter season, flocking behavior has an advantage against predation pressure because with the increasing number of individuals predation pressure decrease as observed in Cheer pheasant (Kaul, 1990; Young *et al.*, 1987) and domestic fowl (Leonard & Zanette, 1998).

Table 1. Records of sighting of Black Francolin *Francolinus francolinus* at Mandal valley, Garhwal Himalaya, India.

Months	No. of sighting	Total individuals	Individual/ sighting	Average group size	Largest group size
January2019	08	23(09)	2.88 ± 0.47	2.01 ± 0.46	3.01 ± 0.60
February	11	18(10)	1.64 ± 0.23	1.42 ± 0.21	2.20 ± 0.23
March	12	19(12)	1.58 ± 0.26	1.50 ± 0.18	1.98 ± 0.29
April	15	15(15)	1.00 ± 0.06	1.00 ± 0.06	1.87 ± 0.24
May	17	23(19)	1.35 ± 0.17	1.15 ± 0.08	2.18 ± 0.37
June	15	17(15)	1.13 ± 0.09	1.10 ± 0.05	2.01 ± 0.28
July	17	24(16)	1.41 ± 0.11	1.35 ± 0.10	1.92 ± 0.38
August	18	26(18)	1.44 ± 0.17	1.39 ± 0.12	2.03 ± 0.37
September	14	25(14)	1.79 ± 0.37	1.60 ± 0.19	2.79 ± 0.54
October	15	28(16)	1.87 ± 0.41	1.75 ± 0.20	2.80 ± 0.57
November	15	27(16)	1.80 ± 0.40	1.72 ± 0.19	3.03 ± 0.57
December	12	26(13)	2.17 ± 0.53	1.91 ± 0.41	3.32 ± 0.87
Average	169	271(173)	1.67 ± 0.27	1.49 ± 0.31	2.43 ± 0.44

Table 2. Seasonal variation of sighting of Black francolin *Francolinus francolinus* at Mandal valley, Garhwal Himalaya, India.

Sightings	Mean $\pm$ S.E			
	Winter (Nov. to Jan.)	Spring (Feb. to April)	Summer (May to Jul.)	Monsoon & Post monsoon (Aug. to Oct.)
Individuals/sighting	2.28 $\pm$ 0.47	1.41 $\pm$ 0.18	1.30 $\pm$ 0.12	1.70 $\pm$ 0.32
Average group size	1.88 $\pm$ 0.35	1.31 $\pm$ 0.15	1.20 $\pm$ 0.08	1.58 $\pm$ 0.17
Largest group	3.12 $\pm$ 0.68	2.04 $\pm$ 0.24	2.02 $\pm$ 0.30	2.54 $\pm$ 0.49

CONCLUSION

Their study suggested that Garhwal Himalaya need special conservation strategies that are still lacking which otherwise would further endanger important species as going on. In spite of this study, no current report is available on the ecology of Black francolin of temperate habitats. Our knowledge about Black francolin of this habitat is little till date. The present investigation is an attempt which could serve as a benchmark for management point of view and future habitat level research investigation.

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