

Population Density of Grey Francolin (*Franclinus Pondicrius* L.) in District Tando Allahyar, Sindh, Pakistan

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Recommended Citation

Kaleri, R. R., Kaleri, H. A., Solangi, G. M., Mangi, R. A., Solangi, A. W., Mangrio, Z. A., Khushk, F. A., Memon, M. A., Soomro, M. A., Bhuptani, D. K., & Ahmed, I. (2023). Population Density of Grey Francolin (*Franclinus Pondicrius* L.) in District Tando Allahyar, Sindh, Pakistan, *Journal of Bioresource Management*, 10 (4).
ISSN: 2309-3854 online

(Received: Jul 10, 2023; Accepted: Sep 5, 2023; Published: Dec 26, 2023)

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POPULATION DENSITY OF GREY FRANCOLIN (*FRANCLINUS PONDICRIANUS* L.) IN DISTRICT TANDO ALLAHYAR, SINDH, PAKISTAN

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ABSTRACT

The population density of Grey Francolin (*Franclinus Pondicrianus* L.) is distributed throughout the Baluchistan, KKPK, Punjab, and Indus plains of Sindh Province, Pakistan. The grey francolin is a prime game bird of our country. This species has been declared threatened worldwide according to the Red Data Book, also published by the International Union for Conservation of Nature in 2018. There is no information available regarding the density of the population of Grey francolin in different populations in the district of Tando Allahyar, Sindh, Pakistan. Keeping this in mind, the present study was carried out to find the density population of Grey francolin birds in the habitat area to observe the conservation measurements. The study was conducted through direct sighting with the help of local residents of the particular areas using the Visual Encounter Method." The observations were recorded at three fixed transects, with a length of 300 to 350 m and a width of 30 to 60 m laid down at every site for recording the birds by nearest line. In Tando Allahyar, Sindh, Pakistan, the population density of Grey francolin varies significantly based on breeding practices and habitat characteristics. The observed densities were 0.90 birds per hectare in cultivated open land and 0.16 birds per hectare in wetland and associated natural vegetation. This suggests a notable influence of habitat and breeding practices on Grey francolin populations.

Keywords: Population density, grey francolin, Tando Allahyar, Sindh, Pakistan.

INTRODUCTION

The Grey Francolin (*Franclinus Pondicrianus* L.) belonged to the family Pheasinidae. This is a medium-sized indigenous pheasant bird of Pakistan. The Grey Francolin is widely spread in dry areas of Pakistan and has extended to Bangladesh, India, and Sri Lanka (Mahmood et al., 2010). This bird is commonly found in dry, open, dehydrated

grasslands with particularly cultivated fields in rural areas (Khan et al., 2015). Grey Francolin, known as the farmer's friend, normally feeds on seeds, shoots, insect pests their larva eggs, beetles, caterpillars, ants, bugs, and aphids (Heidari et al., 2009). The Grey Francolin commonly lives in the Indus plains tropical forest as well as hills in different areas, including Makran, Sibi, and Lasbela regions of Baluchistan province. The

severe cold and drought are the limiting factors for the *F. francolinus* population (Liao et al., 2007). Its distribution is reported in the Indus plains, tropical thorn forests, and all over the inferior hills of Lasbela and Makran in Baluchistan (Ali and Repley, 1993; Liao et al., 2007), with the population of the Grey Francolin species decreasing. There are many factors that are the main reason for the reduction of this species, such as excessive predation, overgrazing, and illegal and non-limited hunting with guns. low availability of food, forest destruction, habitat reduction due to cultivation of land, reduction in plant diversity, increased extreme hot and cold temperatures with drought periods, and use of dangerous pesticides on the agriculture fields in the Asian region (Ali et al., 2002). Khan and Mian (2013), reported the Grey Francolin specie can be seen during dawn and dusk in the grassland, dense vegetation, and cultivated crops for feeding purposes. The district of Tando Allahyar in Sindh province mainly consists of a rural population that is engaged directly and indirectly in the agriculture fields. Due to the large number of cultivated areas of land and dense forest, a large number of Grey Francolin have been found in different areas of this district, which are kept by people for gaming purposes in their homes. But its population is going to decrease due to a number of factors described earlier (Kaleri et al., 2023). Due to a lack of information about the population and density of Grey Francolin in Tando Allahyar district of Sindh, Pakistan, this study was designed to observe the population density of Grey Francolin in different habitats of Tando Allahyar district, Sindh, Pakistan.

METHODOLOGY

Site of Study

The district Tando Allahyar is located in the eastern part of Hyderabad

division. This area is largely consisting of agriculture land and mostly cultivated crops are banana, sugarcane, cotton and many other agriculture cash crops and fruits. Due to hot humid and cold weather during the summer and winter season, respectively.

Study Design

The present study was carried out from December 2021 to August 2022. For this purpose, three different types of sites were selected according to the habitat of Grey Francolin. These sites were open range land with associated grass land, cultivated open land, wetland, and associated natural vegetation. In these grasses, names are added. The three selected areas under the study were different from each other on the basis of vegetation distribution areas. The all three selected areas under the study were different from each other on the bases vegetation distribution areas. In these areas mixed types of vegetation were found with species of *Acacia modesta*, *jawarancusa*, *Oxystelm esculentum*, *Dodonea viscosa*, *Puchea lanceolata*, *Olea ferruginea* and *Convolvulus arvensis* species with number of scattered trees having local names Lawa, Babar, Neem, Talhi including different types of crops cultivated in agriculture fields of rural areas (Memon et al., 2014). These mentioned all type of habitat was varied from each other on the bases of vegetation. For the present study the information was also gained regarding the water availability and evidence of presence of Grey francolin was done by the help of villagers as well as through direct observation including wildlife staff of the district Tando Allahyar. During this study 3 different transect were selected 250 to 350 meter in length and 30 to 60 meter in width to decrease the biasness and considered as replicates to approach the maximum site areas as described by (Gaston, 1980).

Estimation of Grey Francolin Population

In this study, to estimate the populations of Grey francolin in the study areas, the number of observations was taken by direct observation using the Visual Encounter Method. For this purpose, a binocular with a 10-x power lance camera was used to observe the partridge and its movements. During the observation, we were recorded along the above-mentioned transect to observe the partridge under the range of our line (Basit et al., 2021).

The density of Grey francolin population was calculated with the help of the method as suggested by (Burnham et al., 1981).

$$D = \frac{\sum N}{LW}$$

21

Details that

D = represent the density of population, N = Number of Grey francolin, L = Length of transect line, W = Width of transect.

In this study, the survey was performed in the morning from 5:00 to 9:00 AM during the summer and 6:30 to 10:30 AM in the winter while in the evening, from 6:00 to 9:00 PM in the summer and 5:00 to 8:00 AM in the winter (Basit et al., 2021). Indirect observations were also recorded in this study through the observation of feather and fecal presence in the study survey. The parameters of the study were type of habitat, position of partridge at transit, number of individual francolin species present, sighting time, and time spent during each observation of the transect. The collected data about the various parameters within each specific study site were analyzed by student f-test, ANOVA, and Kruskal-Wallis test.

RESULT AND DISSCUSSION

In our findings, the maximum population of Grey francolin was observed (8.440.83) in open range land and associated grass land; after that, 4.80.89 were observed in cultivated open land habitats of Grey francolin. The minimum population (1.010.27) of Grey francolin was found in wetland and associated natural vegetation habitats. In this study maximum number of Grey francolin birds was found during the months of May and June 2022. Details are given in Table 1. In this study, the overall density population of Grey francolin was recoded at 1.08 birds per hector. The maximum density population of Grey francolin birds was observed at 2.41 birds per hector in open range land and associated grass land. The density population in cultivated open land, wetland, and associated natural vegetation was recorded at 0.90 and 0.16, respectively, in Table 2. The findings of our study showed that the density population of Grey francolin was significantly different ($P \geq 0.005$) under all three types of habitats. The analysis of the density population under three different types of habitat, including open range land and associated grass land, cultivated open land, and land with associated natural vegetation, using the equality of variance method of ANOVA, was performed. In this study, all the results of the t test were different from each other. However, the values obtained after applying the Kruskal Willis test for all three types of habitat were $H = 18.621$, d.f. = $P = 0.002$, which significantly differed. (Sangam et al., 2021; Anonymous, 2007; Altaf et al., 2018; and Arshad et al., 2014) reported that fluctuation in temperature is considered the main factor reducing the population of Grey Francolin, whereas during the summer season new brooders are also mature and ready for breeding purposes to increase the birds population. Including these factors, the availability of a sufficient amount of food has also played

a major role in increasing or decreasing the population density of this bird. Cramps & Simmons (1980) reported that snow and severe cold weather are limiting the population of this bird in a particular area, as drought is considered a life-threatening factor for them. There are various possible reasons for decreasing the population, such as illegal hunting, urbanization of cultivated land, netting, grazing, and industrialization of mini-forest land. It is a common fact that seasonal influence highly affects the population of Grey Francolin, but this species starts increasing its population during the summer until the end of the monsoon period. However, the population again declines during the winter season (Hussain et al., 2015; Heidare et al., 2009; Bump et al., 1964). Khan et al., (1991) reported that the density of the population was different during the different seasons; it was observed to be low during the winter and start increasing during the summer season from March to May. The author reported the population density of Black and Grey Francolin in various types of habitat in the Sandal Bar Faisalabad district of Punjab as 1.8, 07, and 4.6 per hectare under wetland and cropland habitats, respectively. Another study was performed by Birdlife (2015): Mahmood et al., (2010) and Khan et al., (2015), at Lehri Nature Park of

Punjab and Mang Game Reserve Haripur, stated the mean number of density populations of Black and Grey francolin was observed at 1.28, 2.43, and 2.20 per kilo meter in wetland, hilly land, and grassland areas, and wetland and cropland along wetland, dry land, and cropland recorded 0.06 birds per hectare at Lehari Nature Park, respectively. The favorable habitat with a high density population was observed. The wild area consisted of wetland with a maximum population of 0.07 birds per hectare. Altaf et al., (2018) and Forcina et al., (2015) suggested that Grey and Black francolin species of partridge have great potential for game hunting due to their tasty flavor as well as being a major source of meat for rural people in Asian regions. In Pakistan, the Black Francolin is stopped by announcing illegal hunting with the punishment of a financial fine of a few thousand Pakistani rupees. According to the above-mentioned research, it could be suggested that Grey Francolin birds preferred open range land associated with grass land and cultivated open land due to the availability of food and shelter-covered places for their nest requirements. However, the wetland and associated natural vegetation areas were more explored by people, who used them for grazing and drinking by livestock animals.

Table 1: Population density Month wise (birds/h) of Grey Francolin observed during different month in the district Tando Allahyar, Pakistan

Study Month	site/ Open associated grass land	range land/ Cultivated open land	Wetland and associated natural vegetation
December (2021)	2 ^f	2 ^f	0
January (2022)	4 ^f	3 ^e	1 ^c
February (2022)	9 ^d	3 ^e	0
March (2022)	8 ^e	7 ^c	2 ^b
April (2022)	10 ^c	8 ^b	4 ^a
May (2022)	13 ^a	10 ^a	0
June (2022)	12 ^b	6 ^d	2 ^b
July (2022)	10 ^c	3 ^e	1 ^c
August (2022)	8 ^e	2 ^f	0
Mean + SE	8.44±0.83	4.8±0.89	1.01±0.27

Table: 2 Density population of Grey Francolin in District, Tando Allahyar, Pakistan

Sites of study	Study area (per hector)	Average No. of Grey Partridge	Density population per hector
Open range land/ associated grass land	4.6 ^c	8.44 ^a	2.41 ^a
Cultivated open land	6.3 ^b	4.8 ^b	0.90 ^b
Wetland and associated natural vegetation	7.7 ^a	1.01 ^c	0.16 ^c

That is the reason Grey Francolins have a threat of predation and avoid habitats such as those in Tando Allahyar district. It is a natural phenomenon that long and bushy plants increase the safety of partridge from hunting and decrease the risk of predation. Such plants are also a source of safety from drought and severe cold weather, as well as decreasing the vegetation area and range of the population.

CONCLUSION

It is concluded that the density of the population of Grey Francolin is highly affected by habitat characteristics and climatic conditions in Tando Allahyar, Sindh, Pakistan.

AUTHORS CONTRIBUTION

All authors contributed towards the analysis, writing and formatting of the manuscript.

CONFLICT OF INTEREST

There was no conflict of interest encountered in this study.

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