

## FRANCOLINS IN IRRIGATED FOREST PLANTATIONS AND SUB-MOUNTAINOUS TRACT OF THE PUNJAB, PAKISTAN

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### ABSTRACT

Population estimates for Black and Grey francolins (*Francolinus francolinus*, *F. pondicerianus*) were made through call-counts. Density per Km<sup>2</sup> in black partridge ranged from 0.12 in Shorkot plantation (very low) to 5.81 in Lal Suhanra National Park (high). In sub-mountainous tract, high density/Km<sup>2</sup> was assessed in Kala Chitta Game Reserve, District Attock. In grey partridge density per Km<sup>2</sup> ranged from 0.03 in Changa Manga to 2.35 in Lal Suhanra. For calling behaviour observation were made on ten black partridge, each for five minutes. Each bird uttered  $15 \pm 0.709$  calls within five minutes (SD = 1.224, DE = 0.387). Overall results indicated that population of both francolin species was not very encouraging. Excessive hunting/netting and habitat degradation were identified as important factors, affecting francolins. Strict watch and ward and habitat improvement with the co-operation of Forest Department will be helpful to conserve these species.

**Keywords:** Francolins, calling frequency, game reserve, habitat degradation

### INTRODUCTION

Black and grey francolins (*Francolinus francolinus*, *F. pondicerianus*) are the prime game birds of Pakistan occupying a variety of habitats. These prefer tropical thorn forests, sub-mountainous tract, reverine forests, grass lands and agriculture ecosystem. The population of both the francolin species has been decimated in agriculture ecosystem after the introduction of intensive agriculture practices including clean cropping, i.e., removing all the rank growth from the field and field borders and use of herbicides and pesticides. Irrigated forest plantations and natural vegetation in sub-mountainous tract are potential habitat for francolins and other wildlife species. For the protection of wildlife species, the plantation and potential areas in sub-mountainous tract have been declared Wildlife Sanctuaries and Game Reserves under Punjab Wildlife Act, 1974.

In both types of habitats, i.e., irrigated forest plantations and sub-mountainous tract, habitat degradation is a serious problem. Vegetation is exploited as trees are cut to be used as timber and lopped for firewood. Understorey/shrubs, herbs and grasses are heavily grazed by livestock, destroying breeding sites of ground nesting birds and sub-terrestrial animal species. Such factors have adversely affected populations of black and grey francolins, along with other wildlife species.

In the present study, population estimates for black and grey partridge were made through call counts irrigated forest plantations and sub-mountainous tract during May-June, 1999.

### MATERIALS AND METHODS

Line transect method was used for call counts in the morning and evening with each session of 1 1/2 hours. Each transect was divided into different stations, one Km away from the other. The calls were noted stopping at each station for about five minutes. Depending upon the pitch of calls, the distance of calling birds was assessed from the observers. The direction of calls were marked with distance on data sheet. High pitch calls, coming from different direction were marked within distance 250 m from the observer. With increased distance between calling bird and observer, the calls fade away, so low pitch calls were marked within distance 250-500 m. Very faded calls were noticed coming from distance > 500 m from the observer.

Calls for black and grey partridge were marked on data sheet with different signs (1 = black partridge, 2 = grey partridge). During inter station distance, any bird observed physically was also noted. Frequency of calling for different birds was also noted by recording number of calls coming from the nearest bird for five minutes. This practice was repeated during morning and evening sessions to assess the calling efficiency of birds.

In sub-mountainous tract, it was not possible to study long transects. It was feasible to mark 2-3 stations 2-3 Km apart from each other and to record calls for one hour each during morning and evening sessions. The study was completed in such a way in Kathar and Kala Chitta areas. Data was analyzed following standard statistics. Transect design is given below:



Following areas were surveyed:

- Changa Manga forest plantation (Wildlife Sanctuary).
- Lal Suhanra Nation Park.
- Kundian Forest Plantation (Wildlife Sanctuary).
- Daphar and Pakhowal Forest Plantation (Wildlife Sanctuary)
- Bhagar forest plantation (Game Reserve)
- Shorkot forest plantation (Wildlife Sanctuary)
- Kamalia plantation (Wildlife Sanctuary)
- Cheechawatni forest plantation (Wildlife Sanctuary)
- Kathar (Game Reserve), District Rawalpindi
- Chakri road area, District Rawalpindi
- Mahora, Kheri Murat and Kali Dauli (Game Reserve).
- National Park, Wildlife Sanctuary and Game Reserve indicate protective status of respective areas.

## RESULTS AND DISCUSSIONS

### Irrigated forest plantation

The results of the study are shown in Table 1-2.

#### 1. Changa Manga forest plantation

Changa Manga plantation was surveyed from April 8-12, 1999. Eight transect were studied for call counts. Population of black partridge was fairly good with per Km<sup>2</sup> density of 40 birds in favourable habitat. Due to sharing of parental care in grey partridge the call frequency was very low hence density of 0.06 birds per Km<sup>2</sup> was assessed.

#### 2. Daphar plantation (WS)

Daphar plantation was surveyed from April 28-30, 1999 and Pakhowal plantation on 01-05-1999 in the morning. Five transects of variable length were surveyed in morning and evening sessions. One transect was studied at Pakhowal plantation in the morning session.

Different transects were studied in different sets of vegetation cover, i.e., in thick plantation, open areas, sparse vegetation covered and vegetation flanked by agriculture land. Overall density of 4.82 birds per Km<sup>2</sup> was assessed. Grey partridge density was very low, as males and females share parental care of chicks, so call frequency was very low and only two calls were recorded.

According to the results grey and black partridge population was not satisfactory in Daphar Pakhowal plantation. The results clearly indicated the preference of habitat/vegetation cover by both species of francolins. The transects in thick vegetation cover were without any population of black partridge and one transect without any population of grey and black partridge. The ratio of black and grey partridge was (1:1) in the plantations.

Density of black and grey partridge per Km<sup>2</sup> was estimated 0.8 and 0.78 birds, respectively. However, given the very healthy conditions of plantation, the population of both francolin species was quite low. The factors

identified and discussed with local people and forest staff were:

- i) Hunting/shooting of partridge in the sanctuary area is quite rare, as it is impossible to carry out hunting/shooting in thick plantation. In case of shooting, the injured birds are not easily traceable by the hunters and hunters are discouraged to practice shooting in such area.
- ii) There is effective control of watch and ward staff posted for Wildlife sanctuary. However, netters sometimes are active to trap chicks, negatively affecting population of grey and black francolins.
- iii) Population of predatory animals (Jackal and Jungle cat) has increased.

#### 3. Kundian plantation (WS)

In Kundian plantation the survey was conducted during the first week of April and wildlife species were recorded. In Kundian plantation there was healthy population of grey and black partridge. However, the estimates were based on total counts rather than estimations. Different compartments in Kundian plantation were surveyed in different times and the counts for each compartment were sum up. According to results 121 black partridge were observed, whereas 193 grey partridge were observed. The results indicate an improvement in population of grey and black partridges.

#### 4. Lal Suhanra (NP)

In National Park area estimated per Km<sup>2</sup> population density of 5.8 black partridge was assessed in favourable compartments. Similarly density of grey partridge was 4 birds per Km<sup>2</sup>.

#### 5. Bhagar plantation (GR)

Bhagar plantation exists in two sub-units. In Wildlife park side plantation transect study was not possible due to small dimension. Two stations, apart one Km were selected and calls were recorded in morning and evening sessions. Then average calls were taken to assess overall population of partridges. According to calls noted ten pair of grey partridge and six pairs of black partridge survive in this sub-unit of plantation.

In the other sub-unit, called Bhagar-Reservoir, eight stations were studied in plantation, along irrigation canal and agriculture fields, 15 calls of grey and two call of black partridge were noted. Eight grey partridge were observed physically. Similarly in this part of plantation 23 pair of grey partridge and two pairs of black partridge survive.

#### 6. Shorkot Plantation (WS)

Shorkot plantation was thoroughly surveyed covering an area of 9.5 Km<sup>2</sup>. Density of 0.12 Km<sup>2</sup> for black and grey partridge was worked out. Excessive hunting/netting has resulted a drastic decline in population of both the francolin species.



### 7. Kamalia plantation (WS)

In Kamalia plantation, the density of black and grey partridge was not very encouraging. Per Km<sup>2</sup> density of 0.33 and 0.22 was worked out for black and grey partridge in surveyed area of 9 Km<sup>2</sup>.

### 8. Cheechawatni plantation (WS)

In Cheechawatni plantation 8 Km<sup>2</sup> area was surveyed with per Km<sup>2</sup> density of 2.13 for black and 0.25 for grey partridge.

## Sub-mountainous tract

### 1. Kathar game reserve

The wildlife habitat is sub-mountainous tract with scrub vegetation. The area was surveyed from evening of 01-05-99 to the morning of 03-05-99. It was not feasible to drive vehicle in the area for transect study. Hence study stations were marked in the Reserve area and calls were noted for one hour in morning and evening sessions. At six station about 2 Km apart from each other, call counts were made.

The upper reaches of the Reserve met fire, but was controlled without much damage by fire. However, small area was mildly affected by fire. The Reserve area was also under serious drought conditions. Within the entire Reserve area the stagnant water was available at 2-3 points. The francolins surviving in the Reserve area were vulnerable to predation and hunting at the water points. Ten pairs of black and three pairs of grey partridge were estimated in the reserve area.

### 2. Chakari road area, District Rawalpindi

The area fall on Chakwal-Chakbaili road. Previously permanent transects were marked in this area. The transects were studied, but no call could be recorded. The area seemed to be potential habitat for both francolin species. However, disturbance by local people and their livestock was very high. With little incentives to local people, the area can be developed into potential habitat for francolins. During the time of study, the francolins population was about nil.

### 3. Kala Chitta, District Attock (GR)

In Kala Chitta, District Attock, three potential areas were surveyed. These included:

- i) Area in the vicinity of Wildlife Park
- ii) Mahora area
- iii) Kali Dahli area

#### i). Wildlife park area

There was fire problem in the area. The area outside the upper boundary of park was under fire. However, it was controlled before it spread over more areas. Road side transects were studied. Within 5 Km distance 10 grey partridge were observed with a flushing distance of about

10 meters. Two calls of grey partridge were also recorded in this transect.

Due to strict protection in this area, there was very healthy population of grey partridge in the area. For black partridge, no call was heard, indicating that black partridge population was very small in this area. In the 2<sup>nd</sup> transect, no call of partridge could be observed. From the results it can be concluded that during morning and evening grey partridge leave vegetation area and come for feeding in open area alongwith the roads and tracks. Resultantly maximum number of partridge were observed along with roadside. It was inferred, that nearly 200-250 grey partridge survive in the intact forest in the vicinity of wildlife.

#### ii) Mohara area

In this area one transect was studied through vehicle covering 4 Km distance and two calls of black partridge within distance 250-500 m were recorded. Density of black partridge per Km<sup>2</sup> was assessed 1.0 birds. Then the area was surveyed and observations were recorded at two different stations. No call was recorded at both the study stations.

#### iii) Kali Dahli area

The area was surveyed and 5 Km were covered. Four grey partridge were observed with flushing distance of 20 m. Two calls within a radius of 250-500 m were also observed. The area is also a potential habitat for grey partridge. With per Km<sup>2</sup> density of 20 partridge on the basis of flushing distance. No call for black partridge was observed in this area.

According to results, a concentrated population of grey partridge survives in the area in the vicinity of wildlife park. Down to park towards Basal, population of grey partridge is low. Hence it can be concluded that dispersion of population takes place from concentrated areas. As one move away from such concentrated areas, per Km<sup>2</sup> density decreases.

### 4. Kheri Murat (GR)

The area was surveyed during evening. The area was surveyed by walking along the tracks and along the side of tracks. About 5 Km area was covered and 11 calls of grey partridge were recorded. Two grey partridge were observed physically. The area of the transect under study was 2.5 Km<sup>2</sup>. Hence per Km<sup>2</sup> density of 5.2 partridge was assessed in this area. The calls were mostly recorded in the open low-lying area alongwith foot-hills. No call of black partridge was recorded indicating very low population of black partridge in this area.

The area is a potential habitat for grey partridge and in open foot-hills a good population of grey partridge survives.



**Table 1: Francolins population estimates density/Km<sup>2</sup> in irrigated plantations and sub-mountainous tract or the Punjab**

| Name of area surveyed                         | Total area (ha) | Status | No. of calls    |                | Density/Km <sup>2</sup> |                |
|---|-----------------|--------|-----------------|----------------|-------------------------|----------------|
|   |                 |        | Black partridge | Grey partridge | Black partridge         | Grey partridge |
| Changa Manga plantation (District Kasur)      | 5063            | WS *   | 61 (9)          | 2 (1)          | 4.00                    | 0.03           |
| Lal Suhanra (District Bahawalpur)             | 51588           | NP **  | 85 (2)          | 35             | 5.80                    | 2.35           |
| Kundian planatataion (District Mianwali)      | 7800            | WS *   | (121)           | (193)          | +121                    | +193           |
| Daphar and Pakhowal plantation (Dist. Gujrat) | 2897            | WS *   | 12 (1)          | 8 (4)          | 4.82                    | 4.72           |
| Bhagat Forest plantation (Dist. Faisalabad)   | 251             | GR *** | 6               | 10             | +6 paris                | +10 pairs      |
|   |                 |        | 2               | 15(8)          | +2 pairs                | +23 pairs      |
| Shorkot plantation (District Jhang)           | 4079            | WS *   | 2               | 2              | 0.12                    | 0.12           |
| Kamalia plantation (Dist. Toba Tek Singh)     | 4396            | WS *   | 3               | 2              | 0.33                    | 0.22           |
| Chechawatni plantation (Dist. Sahiwal)        | 4666            | WS *   | 17              | 2              | 2.13                    | 0.25           |
| Kathar (District Rawalpindi)                  | 1141            | GR *** | 5               | 3              | +10 pairs               | +3 pairs       |
| Chakri road (District Rawalpindi)             | -               | -      | -               | -              | -                       | -              |
| Kala Chitta (District Attock)                 | 132605          | GR *** | -               | 2 (10)         | -                       | +200-250       |
| Kheri Murat (District Attock)                 | 5618            | GR *** | -               | 2 (11)         | -                       | 5.2            |

+ estimated population; \* = wildlife sanctuaries; \*\* = national park; \*\*\* = game reserve.

**Table 2: Calling behaviour of black and grey francolins**

| Sr. No. | No. of calls of different black partridge for 5 minutes | SD    | SE    | Point Estimates                 |
|---------|---|-------|-------|---------------------------------|
| 1       | 10  | 1.224 | 0.387 | 15 ± 0.709 at n-1 df and 95% CI |
| 2       | 22  |       |       |                                 |
| 3       | 20  |       |       |                                 |
| 4       | 13  |       |       |                                 |
| 5       | 17  |       |       |                                 |
| 6       | 09  |       |       |                                 |
| 7       | 16  |       |       |                                 |
| 8       | 10  |       |       |                                 |
| 9       | 13  |       |       |                                 |
| 10      | 20  |       |       |                                 |

#### Calling behaviour of black and grey francolins

Black and grey francolins utter calls as an indication of territorial behaviour. This behaviour is more intensively observed in black partridge as compared to grey partridge. On different birds observations were recorded to count calls for five minutes. Ten birds were studied that uttered 15 ± 0.709 calls for five minutes. Due to low call-frequency in grey partridge, the call-counts were not made on grey partridge (Table 2).

Different authors have surveyed plantations and enlisted avi-fauna. The work is mainly confined to identification of bird species and threats due to various forestry operations.

Chaudhry *et al.* (1992) provided a list of wildlife species of Changa Manga Wildlife Sanctuary. Chaudhry and Khalid (1991) concluded that Eucalyptus is an inferior habitat for wildlife as compared to shisham plantation in central Punjab, plains. Khan,

(1987) studied the bird life of Daphar and Pakhowal plantation in District Gujrat. Khan and Mann (1997) studied, population, the impact of pesticidal and herbicidal use on francolin population in District Faisalabad, through Telemeteric study.

However, density and threats have been highlighted for the first time. Though, density figures derived from the study area not very encouraging due to different threats, but the study provides a basis for future management planning of wildlife species.

#### CONCLUSIONS

The study was very important for population estimation of black and grey partridge for management of wildlife potential areas and sustainable use of biodiversity. Such observations are helpful to incorporate in population estimation for both francolin species. Habitat degradation and illegal hunting are the

major problems for francolin species. Strict watch and ward under legal cover of Punjab Wildlife Act, 1974 and particularly management with Forest Department are very important to conserve our bio-diversity.

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