



## Short Communication

# Breeding Ecology of Kalij Pheasant (*Lophura leucomelanos*) in Northeastern Himalayan, Pakistan

Muhammad Furqan<sup>1\*</sup>, Zulfiqar Ali<sup>1</sup>, Muhammad Mudassar Shahzad<sup>2</sup>, Rida Ahmad<sup>1</sup>, Haqnawaz Yousaf<sup>3</sup> and Imad Ul Din Zangi<sup>4</sup>

<sup>1</sup>Environmental Health and Wildlife Laboratory, Institute of Zoology, University of the Punjab Lahore, Pakistan; <sup>2</sup>Department of Zoology, University of Education, Township, Lahore, Pakistan; <sup>3</sup>Department of Botany, Mirpur University of Science and Technology, Mirpur Azad Kashmir; <sup>4</sup>Department of Wildlife Management, Pir Mehar Ali Shah, Arid Agriculture University Rawalpindi, Pakistan.

**Abstract** | Kalij pheasant is habitat indicator species of ecosystem. The breeding biology of Kalij pheasant was studied in Northeastern Himalayan region, tehsil Nakyal, district Kotli, Azad Jammu and Kashmir, Pakistan from April 2020 to March 2021. Breeding activities of kalij pheasant were recorded from March to July. Breeding calls were recorded in March, April and nesting started in May and June. Incubation started in June, July and mostly hatching occurred in end of June and July. Nests were made up of grasses and leaves of cheer pine. The clutch size of seven eggs was recorded from two nests. The eggs shell was buffy white or creamy, oval shaped, elongated and pointed towards one end. Camera trap recorded the hatching activities on 15<sup>th</sup> July 2020. It was observed that incubation period varied from 22-25 days. Hatching rate was 100% and 85.71% while survival rates 57.41% and 49.98 % were recorded for two nests, respectively.

**Received** | October 25, 2021; **Accepted** | June 18, 2022; **Published** | June 22, 2022

\***Correspondence** | Muhammad Furqan, Environmental Health and Wildlife Laboratory, Institute of Zoology, University of the Punjab Lahore, Pakistan; **Email:** furqanzologist@gmail.com

**Citation** | Furqan, M., Z. Ali, M.M. Shahzad, R. Ahmad, H. Yousaf and I.D. Zangi. 2022. Breeding ecology of Kalij pheasant (*Lophura leucomelanos*) in northeastern Himalayan, Pakistan. *Biologia (Lahore)*, 68(1): 22-25.

**DOI** | <https://dx.doi.org/10.17582/journal.Biologia/2022/68.1.22.25>

**Keywords** | Breeding, Ecology, Kalij pheasant, Himalayan, Azad Jammu and Kashmir



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## Introduction

Pheasant species are most spectacular species in their ecosystem, large, ground dwelling and many are habitat specific having strong association with physical habitat features (Fuller and Garson, 2000; Ramesh, 2003; Garson and Baral, 2007). They are useful indicators of environmental quality due to living in forests (Fuller and Garson, 2000). Due to variation in number of females kalij accompanying

male suggest that they are both monogamous and polygamous (Madge and McGowan, 2002). The breeding season vary from March to June. The mating of kalij pheasant mostly happens in April and May. Males calls the whole summer when circles around a female with drooped wings and body tilted sideways. Male produce a sound like drum with fast beating of his wings with his body, but this spectacle is difficult to be seen in thick forest (Robert, 1991).

Nest is made of different materials like shallow scrapes in ground, tuft of overhanging grasses or stone on hillside. The clutch size is 6-9 eggs and incubation period varies from 20 to 22 days (Ali and Ripley, 1983; Johnsgard, 1986; DNPWC and DFSC, 2018). Kalij pheasant has not been extensively studied in their natural habitat and their population is decreasing (Andleeb *et al.*, 2012). According to IUCN it is Least Concern, but population trend is decreasing (McGowan and Kirwan, 2020; Birdlife, 2021; Furqan and Ali, 2022).

## Materials and Methods

### Study area

The study was conducted in tehsil Nakyal, district Kotli Azad Jammu and Kashmir. The study area was located at Northeastern Himalayan region of Pakistan (Figure 1). The elevations of study area ranged from 1000–2000m (asl), with average annual rainfall of 1500 mm.

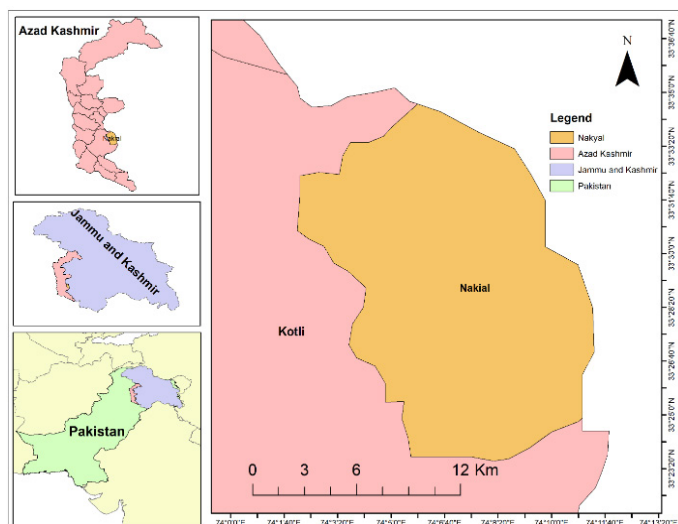


Figure 1: Map of Study area.

### Breeding biology

During survey breeding calls were recorded and nest was found by scanning the area. Information related to breeding calls, nest structure, composition, altitude, slope angle, aspect (North, South, East, West), place of nest (ground, shallow scrape, pit below shrubs), distance from nearest hiding cover, diameter, depth, shrub, herb, grass cover, clutch size, egg shape, colour, incubation, hatching success and chick survival was recorded.

## Results and Discussion

### Breeding calls

The breeding calls of males were recorded at the end

of March and April from different study sites (Table 1). Males usually remained active whole days during the breeding season and calls were produced to chase female at breeding grounds.

Table 1: Chronology of breeding behaviour of kalij pheasant.

Breeding behaviour	Month
Breeding calls start	March
Late frequent calls	March/April
Nesting	May/June
Incubation	Late May/June/July
Hatching	June/July

### Nest structure

There were two nesting sites found during the study period. Nests faced towards the south-east slope and on south slope respectively. One nest was made at the height of 3.5 feet in a pit below shrub stem lined with dry grass, covered with dense bush and grasses (Figure 2). This nesting site also had escaping point at the back covered with grass. The second nest was made on ground in the cover of grass, base with dry leaves of cheer pine (*Pinus roxburghii*), and it was found after hatching during grass cutting in the month of July 2020. After hatching measurement of nest was recorded which showed that the diameter of nests was  $21.5 \pm 1.3$ cm and  $20.2 \pm 0.9$ cm with depth of 9cm and 6cm, respectively (Table 2).



Figure 2: Breeding activities of kalij pheasant recorded from the study area.

### Clutch size

The clutch size of 7 eggs was recorded from both nests. The eggs color was buffy white or creamy and shape was oval, elongated and pointed towards one end.

*Incubation*

Incubation activities of only one nest could be observed while second was found after hatching. We observed the nest of kalij on 2<sup>nd</sup> July 2020 and fixed a camera trap in the nest to record all activities of incubation and hatching. It was reported from the local communities that kalij incubate the eggs for 22-25 days.

*Hatching*

Our camera trap showed that the hatching took place on 15<sup>th</sup> July 2020 (Figure 2) and 7 chicks were hatched showing hatching rate of 100 %. The female left the nest at 1:04 pm on same day. Only female was seen in and around the nest and complete the process of incubation. The chick's body was covered with golden hair.

*Survival rate*

It was noted that only four chicks (57.14 %) remained at the end of November from one pair and three (49.98 %) from other pair (Table 2).

**Table 2:** Nesting ecology and chick survival of kalij pheasant.

Breeding events	Number of nests	
	I	II
Location of nest	Jair Nakyal	Dhara Nakyal
Altitude (m)	1428	1514
Slope angle (degree)	20	0
Aspect	SE	S
Place of nest	In a pit below shrub	On ground with scrap of pinus leaves
Height of nest from ground	3.5 feet	0
Distance from nearest hiding cover (m)	0	8
Diameter of nest (cm)	21.5±1.3	20.2±0.9
Depth (cm)	9	6
Nest composition	Grass	Pinus leaves
Clutch size	7	7
Hatching success	100 %	85.71 %
Chick survival	57.14 %	49.98 %

Reproduction is necessary for survival of species. The kalij pheasants start their breeding activities at the end of March and April. The reproductive behaviour of kalij may be monogamous or polygynous because males were often seen in breeding season with more than one female. Robert (1991) recorded monogamous behavior from Khyber Pakhtunkhwa,

Pakistan. Zaman (2008) recorded the polygynous behaviour of species from Dhodial pheasantry, Mansehra. We could not directly sight the mating but observation of one male with one female (17.04 %) and one male in a group of females (14.81 %) Thus kalij pheasant can assume both type of reproductive behaviour. Male produced loud breeding calls around their territory. Similar finding was reported by Robert (1991) that male produce calls in whole summer and breeding happens in April and May. It was reported from the communities living in the forest that kalij lay eggs in May, June and incubation continues till end of July. We recorded the hatching at mid of July. The nest recorded was covered with dense vegetation and canopy cover giving more protection for hiding and incubating female (Robert, 1991). Base of nests was covered with dry leaves and front side with grasses providing camouflage to female. Similar findings were reported by Kukreti (2015) from Garhwal Himalaya, India. The female during brooding in the nest, keep the surrounding area in sight and take exit in case of danger. It was noted during grass, crops cutting or overgrazing if nest exposed predator (Common raven, fox, snake) pick up the eggs. Sometime nest can be destroyed by water run off or flooding (Robert, 1991). Predation of egg and chick was recorded from many study sites. The sighting of 6-9 eggs were reported from different locations. There were 9 eggs picked up from a locality by local people and incubated them under the domesticated hen. Hatching rate was 100 % but all the chicks could not survive and died after a few days. In the same way many cases were reported from other sites and in mostly cases the chicks did not survive. The nests of 6 and 7 eggs were found during grass cutting from Jair Nakyal but later all eggs were destroyed by common raven. Picking of chicks were also reported from many sites and the survival rate of chicks in captivity was also less. During the breeding season forest fire also destroy the nest and it was recorded from two localities.

Plants play important role for providing cover during the breeding season. The important floral composition of plants recorded near the nest included *Ailanthus altissima*, *Amaranthus viridis*, *Bauhania variegata*, *Berberis lycium*, *Bombax ceiba*, *Cynodon dactylon*, *Dodonea viscosa*, *Olea ferruginea*, *Prinsepia utilis*, *Parthenium hysterophorus*, *Prinsepia sinensis*, *Rubus ellipticus*, *Ricinus communis*, *Solanum nigrum*, *Taraxacum officinale*, *Themeda anathera*, *Ulmus wallichiana*, *Zanthoxylum alatum* and *Ziziphus*



*nummularia*.

## Acknowledgement

We are thankful to IDEA WILD, USA for providing field equipments to conduct this research.

## Novelty Satement

The main objective of this paper was to study about the breeding biology of kalij pheasant with the help of camera traps.

## Author's Contribution

**Muhammad Furqan and Zulfiqar Ali:** Designed the study.

**Haqnawaz Yousaf:** Helped in field work.

**Imad Ul Din Zangi:** Formed the map.

**Muhammad Furqan:** Wrote the article.

**Rida Ahmed and Muhammad Mudassar Shahzad:** Reviewed the article.

## Conflict of interest

The authors have declared no conflict of interest.

## References

- Ali, S. and S.D. Ripley. 1983. Handbook of birds of India and Pakistan. Oxford University Press. Oxford UK. pp. 94-97.
- Andleeb, S., S. Shamim, M.N. Awan and R.A. Minhas. 2012. Modified protocol for genomic extraction of newly plucked feathers of *Lophura leucomelana hamiltoni* Galliformes for genetic studies and its Endo-restriction analysis. Pak. J. Sci. Ind. Res. Ser. B Biol. Sci., 55(2): 108-113. <https://doi.org/10.52763/PJSIR.BIOL.SCI.55.2.2012.108.113>
- BirdLife International, 2021. Species factsheet: *Lophura leucomelanos*. IUCN Red List of threatened species. <http://www.birdlife.org>.
- DNPWC and DFSC. 2018. Pheasant Conservation Action Plan for Nepal (2019-2023).

Department of National Parks and Wildlife Conservation and Department of Forests and Soil Conservation. Kathmandu, Nepal.

Fuller, R.A. and P.J. Garson. 2000. Pheasants status survey and conservation action plan 2000–2004. WPA/ Birdlife/SSC Pheasant specialist group. IUCN.

Furqan, M. and Z. Ali. 2022. Feeding ecology, threats and conservation management of kalij Pheasant (*Lophura leucomelanos*) in Azad Jammu and Kashmir, Pakistan. 54(6): 2543-2551. <https://doi.org/10.17582/journal.pjz/20200816170856>

Garson, P. and H.S. Baral. 2007. Cheer pheasant conservation summit in Kathmandu. Danphe, 16(1): 24-25.

Johnsgard, P.A., 1986. The pheasants of the world. Oxford University Press, New York, USA.

Kukreti, M., 2015. Ecology of widespread white crested kalij pheasant (*Lophura leucomelano hamiltoni*) in Garhwal Himalaya India. J. Glob. Sci., 4(1): 1245-1249.

Madge, S. and P. McGowan. 2002. Pheasants, partridges and grouse: A guide to the Pheasants, Partridges, Quails, Grouse, Guinea fowl, Buttonquails and Sandgrouse of the World. London: Christopher Helm.

McGowan, P. J. K. and Kirwan, G. M., 2020. Kalij Pheasant (*Lophura leucomelanos*). In birds of the world (J. del Hoyo, A. Elliott, J. Sargatal, D.A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bow.kalphe.01>

Ramesh, K., 2003. An ecological study on pheasants of the Great Himalayan National Park, Western Himalaya (dissertation). Forest Research Institute, Deemed University, Dehradun.

Roberts, T.J., 1991. The Birds of Pakistan, Non-Passeriformes. Oxford University Press, Oxford, UK. pp. 243-245.

Zaman, I.U., 2008. Conservation of pheasants in North-West Frontier Province, Pakistan. Graduate Student thesis, Dissertations, and Professional Papers. pp. 10860.