

Feeding Ecology, Threats and Conservation Management of Kalij Pheasant (*Lophura leucomelanos*) in Azad Jammu and Kashmir, Pakistan

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ABSTRACT

Pheasants are bioindicators of our ecosystem and their population is declining. We investigated diet composition and threats to kalij pheasant *Lophura leucomelanos* to prepare conservation and management strategies in Azad Jammu and Kashmir, Pakistan. The diet analysis was done through crop contents of kalij pheasants, threats were assessed through field surveys, communities meeting, and data from 250 questionnaires during April 2020 and March 2021. Based on analysis of threats data, conservation management strategies are recommended. The diet analysis showed that mostly the kalij consumes plant matter as the major diet. We recovered 45 plant species in major, minor, and trace forms which consisted of seeds, leaves, flowers, fruits, rhizomes, and bulbs. Invertebrates including ants, insects, larvae, and grit were also recorded. According to respondents the highest sighting (62.4%) of kalij pheasant was recorded from the forest, followed by cultivated land (20.4%). Major threats to kalij pheasant include forest fire (41.6%), followed by hunting (27.2%), habitat destruction (18.8%), and natural predators (12.4%). The hunting (n=142) of kalij and hunting index (0.855) was recorded during the study period. The maximum hunting was in the evening (54.23%, n=77) followed by night (28.87%, n=41) and the main purpose was food. Stealing of eggs and chicks capturing was recorded from many sites. As per respondents, local community is also concerned about the conservation of this species. Development of more protected areas for conservation, awareness education, implementation of wildlife laws, patrolling of officials in the breeding season, and long-term monitoring plan can help in the conservation of kalij pheasant.

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Authors' Contribution

MF and ZA designed the study. MF collected the field data and wrote the article. ZA finalized the article.

Key words

Kalij pheasant, Feeding ecology, Threats, Conservation, Monitoring

INTRODUCTION

Galliformes are important avian groups all over the world and known as game birds (del Hoyo *et al.*, 1994; Zhang *et al.*, 2003; Grzimek *et al.*, 2004). Pheasants are useful indicators of environmental quality due to living in forests and used as a source of food (Fuller and Garson, 2000). The diet composition has considerable variation among pheasants, feeding habits, season, availability of food resources, and even by habitat. The diet includes mostly seeds, roots, leaves, shoots, flowers, stems, buds, invertebrates, and even reptiles (Mcgowan, 1994).

Asian pheasants are an important part of ecosystems, but little quantitative information is available on the diet in the wild (Hill, 1985). Study of food analysis is very important in wildlife ecology. The food environment differs concerning variations in food availability both spatially and temporally (McShea, 2000). The analysis of crop contents is very helpful for the identification of a

fresh diet (Carss, 1997). Kalij *Lophura leucomelanos* may prefer insects, worms, larvae, snakes, lizards, herbs, shrubs, roots, tuberous roots, berries, and small seeds (Baker, 1930; Johnsgard, 1986).

Galliformes lack studies about macroscopic ecology, genetics, management, and conservation. Information about these is important to increase long-term monitoring plans for the conservation of Galliformes (Tian *et al.*, 2018). Galliformes are adversely affected due to habitat loss, particularly pheasants (Jones, 2001; Lawes *et al.*, 2006), which cause the loss to their distribution (Deng and Zheng, 2004), rise in mortality (Robinson *et al.*, 2016) and nest survival (Goddard and Dawson, 2009).

All pheasants are facing many threats related to population explosion, intrusion (Nawaz *et al.*, 2000), human disturbance (Storch, 2013), habitat loss (Lawes *et al.*, 2006; Bhattacharya *et al.*, 2007; Zhou *et al.*, 2015), urbanization (McNew and Sandercock, 2013), poaching, and diseases (Miller, 2010). Pheasant population is declining due to hunting because of fascinating plumage and meat, and egg damage in the breeding season (Nan *et al.*, 2004; Bhattacharya *et al.*, 2007; Inskipp *et al.*, 2016) resulting in wiping out several species from natural habitat

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restricted to patchy areas (Johnsgard, 1999).

The primary causes of biodiversity loss are due to human conversion of land cover and its uses (Haines-Young, 2009). Their population has also decreased due to poaching in their intrinsic habitat (Nawaz *et al.*, 2000). There is a need of comprehensive research on the effects of human interference on Galliformes (Froese *et al.*, 2015; Zhang *et al.*, 2015). Sufficient data collection of particular species is materially required for conservation (Fuller and Garson, 2000).

Kalij pheasant has not been extensively studied in their natural habitat and their population is decreasing (Andleeb *et al.*, 2012). Threats become more severe and cause the decline of a population. There is a need for a comprehensive management strategy for conservation awareness and population monitoring programs for Kalij in their natural habitat with the help of the local community. Kalij pheasant is distributed in Azad Jammu and Kashmir, but in-depth research is lacking about their diet, threats, and conservation management, hence scientific efforts are necessary to elaborate the ecological data about Kalij pheasant.

MATERIALS AND METHODS

Study area

Azad Jammu and Kashmir is blessed with enriched flora and fauna. The current research was carried out in Mirpur Division which consists of three districts i.e., Mirpur (33°1480'N, 73°7437' E), Bhimber (32°9753'N, 74°0858'E) and Kotli (33°5008'N, 73°9007' E) (Fig. 1). Mirpur Division is situated in the southeastern part of the State of AJ and K. It is bordered by Rawlakot District in the North, District Jhelum in the South, Indian Administrated Kashmir in the East, and Rawalpindi in its West. The study area covers an area of 4,388 km², elevation ranges between 270m–2000m above sea level (asl). Topographically Mirpur and Bhimber regions are plains, with scattered small hills and nullahs while district Kotli has mostly hilly areas with small, scattered plains.

Diet analysis

The crop analysis technique was used for the identification of diet (Rosenberg and Cooper, 1990; Lopes *et al.*, 2016). There were five kalij pheasant found dead during the field visit of different localities of the Mirpur Division (Duraes and Marini, 2005), were kept in a plastic bag and frozen. The birds were defrosted in the laboratory. The crop contents of five kalij pheasant were also collected from the hunters in the hunting season. The crop and gizzard contents were removed and preserved in ethanol (70%). The plant species were identified in the Botany department

of Mirpur University of Science and Technology following Carss (1997). After identification, plant fragments were counted based on occurrence (presence/ absence) and categorized as major, minor, or trace items. The presence of invertebrate parts was also recorded.

Threats and conservation management

Threats to kalij pheasant were found by conducting extensive surveys, in the study area from April 2020 to March 2021. Threats were assessed by questionnaire, interviews, group discussions, participatory observations with the local community, hunters, and wildlife staff. Meetings were organized to determine the opinions of the local community on hunting, forest fire, and snaring activities in the study area. A total of 250 questionnaires were filled from Mirpur Division by the local community. The first part of the questionnaire was about the respondent's personal information i.e., name, gender, age, education, occupation, and the second part designed to collect information regarding the presence, population trend, major threats, hunting pressure, hunting methods, and likeness for conservation of kalij pheasant in respective areas. Based on threats data, strategies are recommended for management and conservation of kalij pheasant.

Hunting index

Illegal hunting of kalij pheasant was reported from the study area. Hunting index was found out by following: $\text{Hunting Index} = \frac{\text{Hunting incidents reported}}{\text{Total number of survey}}$

Hunting data were collected by interviews from hunters and wildlife department staff of AJ and K.

Statistical analysis

All field data were statistically analysed using MS Excel (Ver. 2016).

RESULTS

Diet

The diet analysis showed the omnivorous behaviour of kalij pheasant. A total of 45 plant species were recovered from the crop contents including tree species (n=7), shrub species (n=12), herbs (n=15), grasses (n=10) and one climber. The parts of plants included seeds, tubers, leaves, flowers, and fruits. The major diet consisted of *Ziziphus mauritina*, *Grewia optiva*, *Mallotus philippensis*, *Olea ferruginea*, *Gymnosporia royleana*, *Ziziphus nummularia*, *Lantana indica*, *Melilotus indica*, *Brassica campestris*, *Pennisetum glaucum*, *Dichanthium annulatum*, *Heterpogon contortus*. The minor diet components of food included *Ficus religiosa*, *Berberis lyceum*, *Rubus ellipticus*, *Oxalis corniculata*, *Medicago polymorpha*, *Amaranthus viridis*,

Mentha royleana, *Zea mays*, *Triticum aestivum*, *Sorghum halepense*, *Chrysopogon aucheri*, *Eleusine indica*, *Dioscorea bulbifera* (bulb). The invertebrates included different ants, insects and larvae while grit was also recorded (Table I).

Table I. Diet analysis of Kalij pheasant from Mirpur Division Azad Jammu and Kashmir.

S. No	Species name	Local name	Habit	Availability	Category
1	<i>Ziziphus mauritiana</i>	Bair, Unab	T	Apr-July	Major
2	<i>Grewia optiva</i>	Dhaman	T	Apr-Sep	Major
3	<i>Mallotus philippensis</i>	Kameela	T	Feb-Apr	Major
4	<i>Ficus palmata</i>	Phagwarri	T	May-Sep	Major
5	<i>Olea ferruginea</i>	Kahu	T	Apr-May	Major
6	<i>Ficus religiosa</i>	Peepal	T	May-Sep	Minor
7	<i>Citrus sinensis</i>	Malta	T	Jan-March	Trace
8	<i>Gymnosporia royleana</i>	Patakhi	S	Sep-Jan	Major
9	<i>Tulip clusiana rhizome</i>	Lady tulip	S	Mar-Jul	Trace
10	<i>Carissa opaca</i>	Garanda	S	Apr-Jun	Major
11	<i>Vitex negundo</i>	Kala Banna, Nirgundi	S	Whole year	Major
12	<i>Ziziphus nummularia</i>	Jand Beri	S	Mar-Jun	Major
13	<i>Grewia tenax</i>	Kango	S	Feb-Aug	Major
14	<i>Zanthoxylum armatum</i>	Timber	S	Mar-Apr	Minor
15	<i>Lantana indica</i>	Lantana	S	Jul-Sep	Major
16	<i>Rosa brunonii</i>	Tarni, Tandyari	S	Apr-Jun	Major
17	<i>Berberis lyceum</i>	Sumbal	S	Apr-Jun	Minor
18	<i>Rubus ellipticus</i>	Peela Akhra	S	Apr-Jun	Minor
19	<i>Himalrandia tetrasperma</i>	Ghanaloo	S	May-June	Minor
20	<i>Oxalis corniculata</i>	Khatmit, Jandoro	H	Mar-Oct	Minor
21	<i>Medicago polymorpha</i>	Maina	H	Mar-May	Minor
22	<i>Melilotus indica</i>	Ran-Methi, Sinji	H	Mar-Aug	Major
23	<i>Withania somnifera</i>	Aksun, Koori Chinothi	H	whole year	Major
24	<i>Asplenium adiantum-nigrum</i>	Fern	H	Jun-Aug	Major
25	<i>Trifolium repens</i>	Shatala	H	Apr-Jul	Major
26	<i>Scandix pecten veneris</i>	Venus comb	H	Apr-Jul	Major
27	<i>Galium aparine</i>	Lahndra	H	Mar-Jul	Minor
28	<i>Brassica campestris</i>	Sarsun	H	Nov-Feb	Major
29	<i>Eruca sativa</i>	Tara mira	H	Feb-Apr	Minor
30	<i>Amaranthus viridis</i>	Ganhar, Cholai	H	Mar-Oct	Minor
31	<i>Plantago major</i>	Isabgool	H	Aug-Sep	Minor
32	<i>Amaranthus spinosus</i>	Surkh Ghanyar	H	May-Sep	Trace
33	<i>Mentha royleana</i>	Jangli Pudina	H	Jul-Oct	Minor
34	<i>Phaseolus vulgaris</i>	Kidney bean	H	May-Oct	Trace
35	<i>Pennisetum glaucum</i>	Bajra	G	Jun-Aug	Major
36	<i>Zea mays</i>	Mak, Makaie	G	Jul-Sep	Minor
37	<i>Triticum aestivum</i>	Kanak, Gundam, Wheat	G	Dec-Apr	Minor
38	<i>Avena sativa</i>	Jai	G	May-Aug	Major
39	<i>Cynodon dactylon</i>	Chhabbar, Khabbal	G	Whole year	Major
40	<i>Dichanthium annulatum</i>	Palwan Ghaas	G	Mar-Nov	Major
41	<i>Sorghum halepense</i>	Baru, Barwa	G	May-Sep	minor
42	<i>Heterpogon contortus</i>	Sarriyala Gaas	G	Jun-Oct	Major
43	<i>Chrysopogon aucheri</i>	Bari Gaas	G	Mar-May	Minor
44	<i>Eleusine indica</i>	Mandhano	G	Jun-Aug	Minor
45	<i>Dioscorea bulbifera</i> (bulb)	Air potato	C	Jul-Sep	Minor

T, Tree; H, Herb; S, Shrub; G, Grass; C, Climber

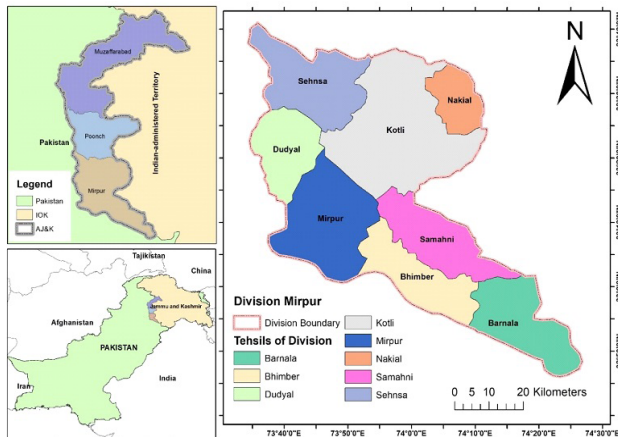


Fig. 1. Map of Mirpur Division Azad Jammu and Kashmir.

Threats

During the field survey 250 persons from local communities were interviewed through questionnaire about the sighting, hunting, threats, likeness and conservation of kalij pheasant. The respondents included 197 males and 53 females. They were further divided into four age groups, 15-30 years (46%, $n=115$), 31-45 years (27.6%, $n=69$), 46-60 years (18.8%, $n=47$), more than 61 years (7.6%, $n=19$). The respondent's education information was categorized as under matric (18%, $n=45$), matric (28.4%, $n=71$), graduation (32.4%, $n=81$) and master (21.2%, $n=53$) degree qualification. Majority of respondents were students (46%, $n=115$), followed by other professions (teachers, tailors, Government servants etc.) (28.4%, $n=71$), farmers (14.4%, $n=36$) and shop keepers (11.2%, $n=28$) (Table II). In response to a question about the observation of kalij pheasant, 78.8% ($n=197$) respondents had seen the species while 21.2% ($n=53$) did not. The majority (64.8%, $n=162$) of respondents have seen the feathers, fecal matter, and footprint of kalij pheasant while (35.2%, $n=88$) have not seen. The highest (62.4%, $n=156$) sighting of kalij pheasant was recorded from the forest, followed by cultivated land (20.4%, $n=51$), other places (10.4%, $n=26$) and human settlements (6.8%, $n=17$) (Fig. 2).

Among all respondents 46% ($n=115$) had heard the calls, while 56% ($n=135$) had not heard the calls of kalij pheasant. The majority (72.4%, $n=181$) of respondents were of the view that the population was decreasing, while (10.8%, $n=27$) considered that the population was increasing and (16.8%, $n=42$) replied that the population was stable (Fig. 3). In response to the question about the responsibility of population decrease, many (57.2%) of them answered that local community was responsible followed by forest department (22.8%), wildlife department (16.8%) and others (3.2%), respectively.

Table II. Personal biodata of respondents for questionnaire data.

Description	Category	Number	%
Gender	Male	197	78.8
	Female	53	21.2
Age	15-30	115	46
	31-45	69	27.6
	46-60	47	18.8
	61 and above	19	7.6
Education	Under matric	45	18
	Matric	71	28.4
	Graduation	81	32.4
	Master	53	21.2
Occupation	Student	115	46
	Farmer	36	14.4
	Shop keepers	28	11.2
	Others	71	28.4

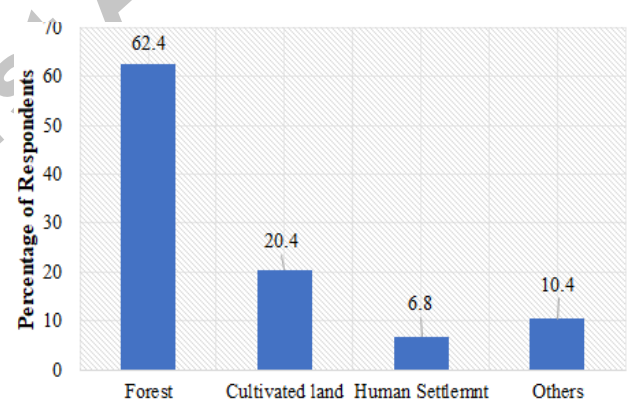


Fig. 2. Sighting of Kalij pheasant from different places.

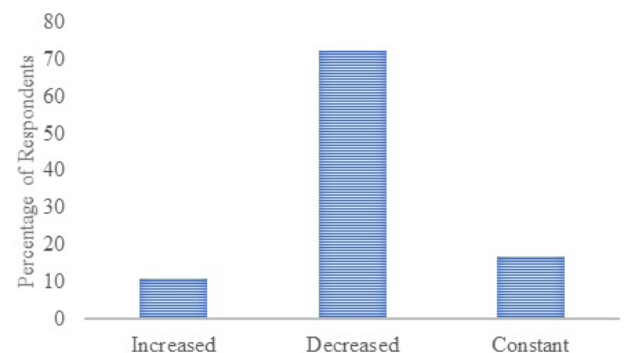


Fig. 3. Population trend of Kalij pheasant in Mirpur division AJ and K.

The major threats for declining population were forest fires (41.6%, n=104), followed by hunting (27.2%, n=68), habitat destruction (18.8%, n=47), and natural predators (12.4%, n=31) (Fig. 4). According to respondents, disturbance due to presence of human population affects the kalij pheasant, and as they viewed low (23.6%, n=59), medium (54.8%, n=137), high (12.4%, n=31) and no disturbance (9.2%, n=23). Among the respondents, 22.8% (n=57) hunt the kalij pheasant while 77.2% (n=193) do not hunt. During the study period, 142 hunting cases were recorded for the species in question. The maximum hunting was in the evening (54.23%, n=77) followed by night time (28.87%, n=41) and morning time hunting (16.9%, n=24). In response to a question about the purpose of killing, 96.4% (n=241) stated that it was hunted for food followed by sport hunting (2.8%, n=7) and others (0.8%, n=2). In hunting, maximum 56.8% (n=142) hunters were involved, followed by local community (36.8%, n=92), farmers (3.6%, n=9) and others (2.8%, n=7) (Fig. 5). Various ways were used to hunt the pheasant, such as gun (89.6%, n=224), net, (7.6%, n=19), trap (4.8%, n=12) and by hunting dogs (2.8%, n=7).

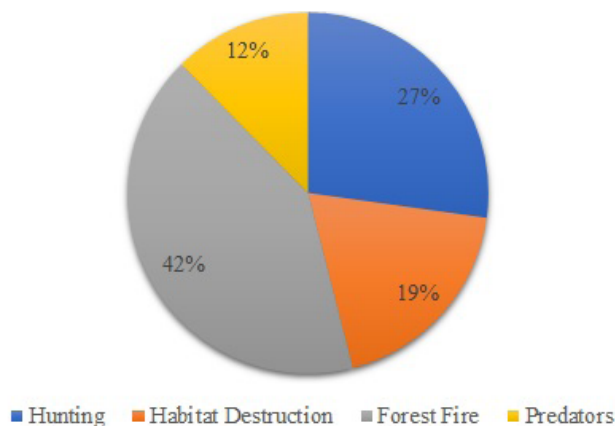


Fig. 4. Major threats to Kalij pheasant from study area.

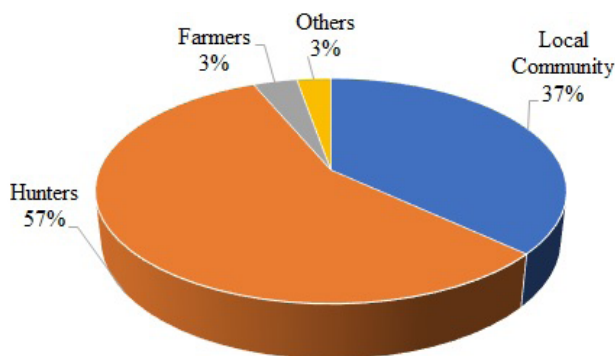


Fig. 5. Involvement in hunting from the study area.

Around 35.6% (n=89) respondents had witnessed egg stealing cases while 64.4% (n=161) reported no stealing from their areas. Furthermore, 26% (n=65) respondents mentioned about capturing of kalij chicks while 74% (n=185) reported the opposite. The most affected anthropogenic activity was deforestation (46.4%, n=116) followed by roads (30.4%, n=76), houses (16.4%, n=41) and others (6.8%, n=17) (Fig. 6). All the respondents showed positive attitude towards conservation of kalij pheasant. The most of respondents (52.4%, n=131) had the opinion that the local community should be responsible for the conservation of kalij pheasant while 30.4% (n=76) gave the responsibility to both the local community and wildlife department and 17.2% (n=43) considered it as a responsibility of the wildlife department only (Fig. 7).

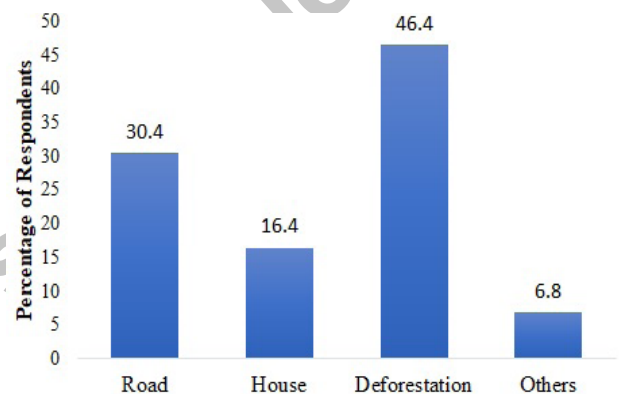


Fig. 6. Anthropogenic activities affected the population of Kalij pheasant.

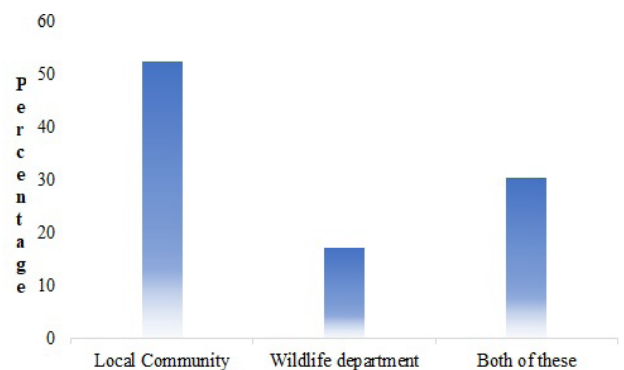


Fig. 7. Responsibility for the conservation of Kalij pheasant.

Hunting index

The hunting index of kalij pheasant was calculated with number of kalij hunted by total number of surveys and it was recorded as 0.855 for the year 2020-2021 (Table III).

Table III. Hunting index of Kalij pheasant from Mirpur Division.

Variables	2020-21
Total number of hunting reports	142
Total number of surveys	166
Hunting index	0.855

DISCUSSION

The diet plays an important role in the survival of species. Availability of diet depends on the type of habitat which fulfils the requirement of the species. The diet analysis showed that the major diet of kalij pheasant was plants while invertebrates contributed minor role in their diet. Feeding habits may have changed according to food availability, seeds, leaves, fruits, and if they were not available roots were eaten by scratching the ground. The availability of insects reduces the consumption of plant matter and becomes an important part of the diet. The pheasant fulfils their protein requirement from invertebrates which is necessary for their and chick survival (Hill, 1985).

The diet of kalij pheasant recovered from Kumaon region of western Himalayas (Hussain and Sultana, 2013) consisted of *Berginea ligulata*, *Rubus biflorus*, *Rubus ellipticus*, *Myrcine africana*, *Fragaria* sp. as major food items. According to pre monsoon season *Geranium wallichianum*, *Thalictrum foliolosum*, *Boeninghausenia albiflora*, *Viola* sp., invertebrates and grit recorded as minor food items of kalij pheasant, while *Geranium wallichianum*, *Viola* sp., and invertebrates as major in post-monsoon season. The plant species consumed vary in the season. Kalij pheasant was also observed during the study directly feeding on seasonal crops (wheat, corn, millet, maize) and vegetables. The invertebrates and grit made a small portion of the diet. The grit component was recorded in adults showing that it helped in the grinding of vegetation in the gizzard for complete digestion of food (Hussain and Sultana, 2013). Lewin and Lewin (1984) also proved the omnivorous behavior of kalij pheasant from the Island of Hawaii and recorded different plants and animals. The studies on direct observation of feeding of ring-necked pheasant have been conducted by Zhengjie (1989) and Jianqiang and Yue (1989) recorded 62 plant and animal species from the diet of brown-eared pheasant respectively. Forty-eight plant species were consumed by Sclater's monal (*Lophophorus sclateri*) and 43 by blood pheasant (*Ithaginis cruentus*) from the habitat of Gaoligong China. They suggest in case of food deficiency pheasants change their feeding habit from leaves to roots

and move to lower elevations from snowy areas (Xu *et al.*, 2016). The basic information about the diet of a species is necessary for the conservation of species and its habitat.

Pheasants are facing many threats due to which their population is declining. Kalij pheasant is included as a protected species under the Wildlife Protection Act AJ and K (2015). Respondents included students, teachers, farmers, shopkeepers, labourers. They come from villages early in the morning and return late in the evening, using the same trails in the forest, hence the most of respondents directly sight the kalij pheasant, feathers, and faecal matter. It was the opinion of many respondents that the population of kalij pheasant was declining day by day due to habitat destruction, hunting, and forest fire. Hunting is common in many study sites (Kaul *et al.*, 2004). Most of the hunting and poaching was recorded during September to March in the evening time when they come to their roosting sites. Hunters target the location based on the droppings of faecal matter under the trees. Some cases also reported the removal of complete groups (5) from their roosting place at Durjan, District Mirpur. Hunters and the local community were involved in hunting because of being present in the field. Poaching was also reported from many sites.

Kalij are captured with nets and traps during movement in the field. Incidents of killing by stone have been recorded from the study area Kathar, district Mirpur. Pheasants are hefty bodied and ground inhabiting due to which they take little flight hence they are easily killed by catapult as well. Male pheasants are susceptible to hunting due to the bright colour of feathers that are utilized by local communities as ornamental or in hats (Ramesh *et al.*, 1999). Trapping, picking of eggs, and chicks has also been reported from the study area. Picking of eggs and trapping is one of the major factors causing the low abundance of the pheasant (Hussain *et al.*, 2001; McGowan, 2002; DNPWC and DFSC, 2018).

Habitat destruction was also recorded as an important factor in the decline of pheasants (Gaston *et al.*, 1981; Clark *et al.*, 2013; Inskipp *et al.*, 2016). The kalij population was declining from Kumaon in the Himalayas due to the destruction of oak forest and poaching (Hussain *et al.*, 1997; Khan, 1997). Due to lack of basic facilities, local communities living in the forest mostly depend on forest resources. They get wood for fuel, build houses and vegetation for livestock and other purposes. The forest fire was also recorded a serious threat from different study sites especially during the breeding season, resulting in loss of eggs, chicks, nests, and even adults (Kimothi and Jadhav, 1998; Inskipp *et al.*, 2016). Destruction of nesting was recorded from Burjan, Kaladab and Bandli Khuiratta. Usually, local communities burn the ground vegetation to increase fodder production for their livestock

and the fire cannot be controlled later, spreads to other areas, and causes complete removal of many species. It was noted from many sites in the Mirpur division. All the respondents liked kalij pheasant and had a positive attitude towards conservation. The majority of respondents gave the responsibility for conservation to respective local communities.

Threats are an imminent danger for the survival of pheasants. Therefore, it is necessary to formulate a well-planned management strategy to protect and conserve the species. Local communities can play important role in this matter. It was observed during the field visit that people were unaware of the ecological importance of wildlife, particularly kalij pheasant. Awareness programs among the local communities regarding the conservation of kalij pheasant can play an important role. The involvement of NGOs, wildlife researchers, students, and wildlife department is essential.

According to the [AJ and K Wildlife Act \(2015\)](#), kalij pheasant is protected and placed in Schedule III, which states that animals could not be hunted, killed, or captured. They were mostly hunted and trapped for their delicious meat ([Kaul et al., 2004](#); [Inskipp et al., 2016](#)). Local communities should be made aware that legal action could be taken against those who are involved in illegal hunting, stealing of eggs and chicks. Punishment should be given to, whosoever violates the Wildlife Act. Deforestation, construction of houses, and roads in forest areas should be planned to minimize the loss of natural resources and wildlife. As kalij pheasant occurs in patchy distribution hence protection of particular habitat is vital for their survival. Deforestation and forest fires which cause a great loss to wildlife species should be controlled.

RECOMMENDATIONS

Following recommendations may be considered for the conservation of kalij pheasant in the study area.

1. The different large and linked habitat patches in the study area will be suitable for kalij and other wildlife species if they are declared as protected areas on priority basis.
2. A systematic survey should be organized for the presence of wildlife species to increase the nature reserve for conservation and management.
3. It's necessary to assess the habitat quality and fragmentation because the actual distribution of wildlife species will be determined by the suitability of environmental habitats.
4. Awareness education through conservation programs, meetings, seminars, and conferences should be organized in local communities.

5. Positive attitude and active participation of communities should be increased for biodiversity conservation.
6. Wildlife laws should be implemented in earnest and punishment should be awarded on violation of any offence.
7. Wildlife staff should be trained, well equipped, and monitored through higher authorities.
8. Patrolling by wildlife officials especially in the breeding and winter season can control the stealing of eggs, capturing of chicks, and illegal hunting.
9. Forest fires should be controlled especially in the breeding season.
10. Long-term monitoring programs should be started for the conservation of kalij pheasant.

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Statement of conflict of interest

The authors have declared no conflict of interest.

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