POPULATION STATUS, HABITAT USE AND CONSERVATION THREATS OF KALIJ PHEASANT *(Lophura leucomelana leucomelana)* IN HEMJA AREA, KASKI

A Dissertation submitted to the Institute Of Science and Technology, Tribhuvan University in Partial Fulfillment of the Requirement for the Master's Degree in Zoology (Ecology)

Submitted By

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RECOMMENDATION

Ms. Bhagawati Subedi has completed the dissertation entitled "**POPULATION STATUS, HABITAT USE AND CONSERVATION THREATS OF KALIJ PHEASANT (*Lophura leucomelana leucomelana*) IN HEMJA AREA, KASKI**" under my supervision. This is candidate's original work, which brings out useful findings in the concerned field. Hence, I recommend this dissertation to be accepted for partial fulfillment of requirement for the degree of Master's of Science in Zoology (Ecology).

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APPROVAL

On the recommendation of supervisor Mr.Tej Bahadur Thapa; Lecturer, Central Department Of Zoology, Tribhuvan, University, the dissertation entitled "**POPULATION STATUS, HABITAT USE AND CONSERVATION THREATS OF KALIJ PHEASANT (*Lophura leucomelana leucomelana*) IN HEMJA AREA, KASKI**" submitted by Ms. Bhagawati Subedi has been approved for examination

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ACCEPTANCE

The dissertation entitled "**POPULATION STATUS, HABITAT USE AND CONSERVATION THREATS OF KALIJ PHEASANT (*Lophura leucomelana leucomelana*) IN HEMJA AREA, KASKI**" submitted by Ms. Bhagawati Subedi has been accepted for partial fulfillment of M. Sc. Degree in Zoology with Ecology as special paper.

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ABSTRACT

This study aimed to determine population status, habitat use and conservation threats of Kalij pheasant (*Lopura leucomelana leucomelana*) in Hemja area, Kaski. Roost Survey method was used to collect data on population status of animal, habitat preferences index (HPI) was used to assess the habitat preferences and habitat use and conservation threats was evaluated by questionnaire survey.

A total of 103 individuals of Kalij pheasant were recorded from the study area in altogether 8 visits. The result showed highest monthly density (8.95 per sq Km) in October and least (1.94 per sq Km) in March. Among four types of habitats, the Closed forest with high understorey was most preferred by the Kalij (HPI=1.23) followed by Closed forest with low understorey (0.95), Open forest (0.83) and Terraced field (0.78). In Hemja, 27 species of trees, 8 species of shrubs and 29 species of herbs were recorded. Altogether 34 roosts were found Among the roosting tree *Castanopsis indica* (79.41%) was mainly used by Kalij pheasant in the study area followed by *Schima wallichi* (14.70%), *Angelhadia Spicata* (2.94%) and *Myria esculenta* (2.94%).Mean height ,mean girth at breast height and mean height of lowest branch of roost tree was 7.29m ,0.47m and 4.79m respectively. Most of the respondents showed negative attitude towards Kalij in Hemja area. Evaluation of Conservation threats from the information given by respondents suggests feeding of Kalij pheasant on crop was the most important threats whereas other threats were fire wood collection, disturbance by people in the roost, timber collection, poaching egg collection and grazing.

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1. INTRODUCTION

1.1 Background

The Phasinidae is a very large family of Old World gallinaceous birds, which includes the ancestral chicken and the ancestral peacock (Birdlife International 2000). The family is divided into two subfamilies: the pheasants (Phasiniae) and the Partridges (Perdicinae), among the pheasants are spectacular alpine and sub alpine species like Monals and Tragopans, and also beautiful tropical birds such as Green Peafowl (Birdlife International 2000). Pheasants also known, as game birds are generally heavy bodied with brilliant metallic plumage. They are spectacular colorful birds (Gautam 1999). Eight species of pheasant are recorded in Nepal (Majupuria 1982). Himalayan pheasants of Nepal are poorly known and little studied birds. Very little information on their breeding habits, behavior or status exists in the country (Majupuria 1982).

The Kalij Pheasant is one of 12 game birds. Nine sub species of Kalij pheasants are found in the world (Hermans 1986), but only three intergrading races namely, white crested Kalij (*Lophura leucomelana hamiltonii*), Nepal Kalij (*Lophura leucomelana leucomelana*) and Black blacked Kalij (*Lophura leucomelana melanotus*) have been reported from Nepal. They are different in their morphological features as well as range of distribution (Herman 1986). To date none of the subspecies are listed as endangered (WPA 1993).

The Kalij pheasant have a broad geographic range and are found in the southern foothills of the Himalayan Mountains from Pakistan in west, across northern India and Nepal through upper Burma and also some sub species are found as far south as Bangaladesh (WPA 1993). The White crested Kalij (*Lophura leucomelana hamiltonii*) is inhabitant of the western Himalayas from Indus River in the west to the Ghagra river and the Black backed Kalij (*L. leucomelana melanotus*) lives in the extreme eastern part of Nepal eastward through Sikkim (Herman 1986). The Nepal Kalij pheasant (*L. leucomelan leucomelana*) is found in central Nepal from Ghagra River to the Arun River

(Herman 1986). The altitudinal range of distribution of Nepal Kalij is imperfectly known from 400m in the foothills to 3600m, the last being the highest elevation recorded in Khumbu region by Biswas (Ali and Ripley 1983).

The Nepal Kalij pheasant (*Lophura lecomelana leucomelana*) is fairly common, endemic (Inskipp and Inskipp 1983) resident subspecies in middle hill area. The species has been described by many authors. J. Latham first described Nepal Kalij without giving precise locality, later on Baker gave its locality in Nepal but definite record was made by W. J. Kirkpatrick in 1793 (Inskipp and Inskipp 1991). Baker in 1930 quoted Hodgson's report, as "the Nepal Kalij is by far the commonest pheasant in Nepal and its range is the central region, never found in Terai seldom in the Cachar (the most elevated portions of Terai). He also described the Scully's notes in stray feathers' in 1880, "Nepal Kalij is common wherever thick forest is found from Hetoura in the Dun to valley of Nepal usually seen in pairs or in parties of 3 to 10". The Nepal Kalij is usually reckoned to be living in lowest altitude among pheasants and this is true of its lower limit (Roberts 1979).

Nepal Kalij (*Lophura leucomelana leucomelana*) can be easily identified in the field by its specific characters. The crest on the head and a red "mask" around the eyes is a distinguishing mark. The male and female Kalij differ considerably in appearance. Male is bluish black with white speckling on its lower back and bright red color around the eyes. They have glossy blue back narrowly edged with white feathers at lower black rump and upper tail converts. The wing coverts are white the chin and fore neck are darker and glossier, rest of under parts more whitish. Tail is glossy black and brown of broad arching sickle-shaped feathers.

The female Kalij are fairly plain and are medium brown color with darker and lighter spots. The gray feathers of the under parts conspicuously dark centered and producing a scaly or scalloped effect. Naked orbital skin scarlet seems as in male tail black, not arching of pointed.

The Nepal Kalij roosts in flocks (Baker 1928). The Kalij usually returned to the roost about sun set and the height of roosting branch varying from 4.5 to 8m (Gautam 1999). It is possible to locate roost from the accumulation of fecal matter below the perch (WPA 1980). They show strong site fidelity to roost and communal rooster, roosting generated in a group of 3 to 5 individual (Gautam 1999).

The Nepal Kalij, as a ground feeder bird, is always found foraging on the ground (Gautam 1999). Food items of Kalij include grains, shoots, insects and their larvae, and small reptiles (Ali and Ripley 1969). Gautam (1999) analyzed the food of the Nepal Kalij and found the food consist of 27.30% of leaves, 25.5%of roots, 21.25% of seeds, 11.96% of quartz, 6.30% of animal components, 6.30% of whole plants and 2.49% of flowers.

At the end of March cocks collect in open places and challenge other cocks and also they made the most extraordinary noise and appear to dance round in circles indicating the onset of breeding season (Ali and Ripley 1969). Breeding season is in April through June, eggs are seven vicariously collected from two clutches described by Bakers as warm buff in color and varying in size from 46.1x27.7 mm to 5.30x39.0 mm (Mrs. proud) (Ali and Ripley 1969).

The Kalij pheasant is a common and most widely distributed species. It is found in all types of forest Gaston (1980). In Nepal, it is reported from Chitwan National Park (Baral and Upadhyay 2006), Sagarmatha National Park (Basnet 2004), Langtang National Park (Karki and Thapa 2001), Rara National Park (Giri 2005), Kanchajunga Conservation area (Thapa and Karki 2005), Dhorpatan Hunting Reserve, Sheyphoksundo National Park, Bardia National Park, Makalu Barun National Park, Shivapuri National Park, Parsa Wildlife Reserve, Annapurna Conservation Area (Unpublished checklist, BCN). There are a few studies available in Nepal on the population status, habitat use and conservation threats of the Nepal Kalij.

Nepal Kalij is social bird, which never fight each other (Gautam 1999). From January to May found singly or in pairs, sometimes small groups consisting of a male plus 2-3 females whereas in summer, following breeding usually in

family parties and during October to December in groups of 10-12, perhaps two or more family groups combined (WPA 1980).

1.2 Statement of Problem

The Nepal Kalij is common species in Nepal but it is threatened by habitat loss, poaching and negative attitude of local people towards Kalij throughout the country except in protected areas. Detail ecological information is still lacking. Gautam (1999) had done study on habitat utilization pattern and feeding habits of the Nepal Kalij Pheasant in the northern hills of Pokhara valley and reported the Kalij has been threatened by many factors including poaching. The rate of habitat loss, degradation and poaching is more common in hills and information on the Kalij pheasant of the region is not adequate for conservation purpose.

1.3 Objectives

The main objective of the study was to assess status and habitat of *Lophura leucomelana leucomelana* in Hemja area. The specific objectives of the study were to:

determine population status,
analyze habitat utilization patterns,
investigate the roosting sites and
evaluate conservation threats on Kalij Pheasant.

1.4 Rationale

Present study has assessed the population status, habitat selection pattern and conservation threats of the Nepal Kalij pheasant in Hemja area, which represent middle hills of Nepal. It is hoped such ecological information could be useful to monitor population and habitat and to determine conservation needs of Kalij in this area.

1.5 Limitation of the Study

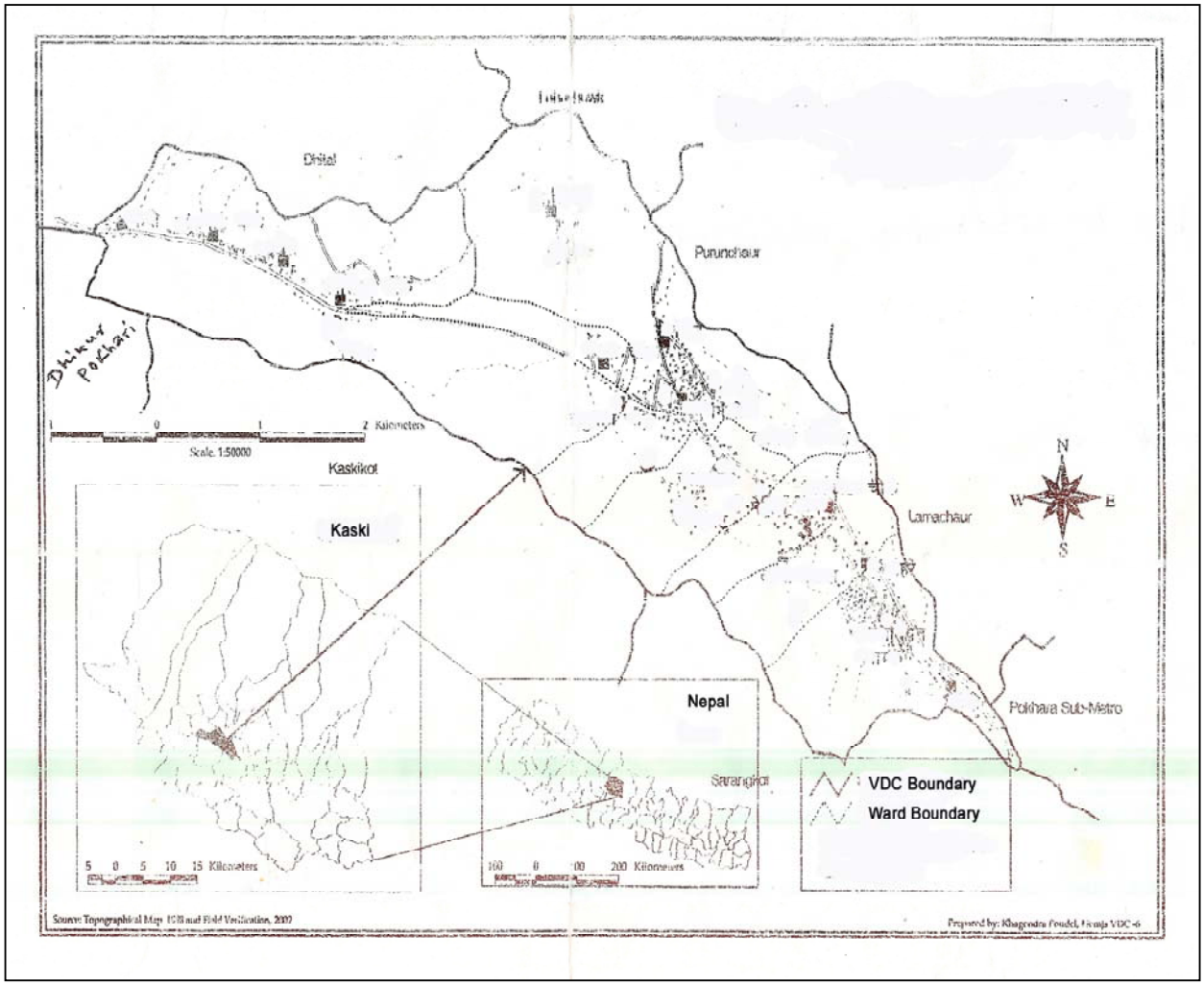
The present study was carried out with limited time, technical and financial resources in a small geographical area.

2. STUDY AREA

2.1 Location

This study was carried out in the community forests of Hemja Area (26^0 16' 46" N to 83^0 55' 12" E) in the North western part of Pokhara valley, Kaski district. Altitude is range from 1100m to 1600m from mean sea level. Hemja area is bordered by Dhukurpokhari in the west, Dhital in the north, Pokhara sub metropolitan city in the east and Kaski in the south.

Map of the study area



2.2 Geology and Soil

Geologically, the study area represents typical Mahabharat range. It is characterized by different types of rocks like limestone, siliceous and calcisilicate. The soil is light brown in colour with poor water retention. Light blackish brown soil with less humus. Somewhere black soil and green soil is also found.

2.3 Climate

The study area is characterized by subtropical in climate. There are three seasons namely; summer, rainy, and winter. The mean monthly temperature ranged from 5.92^{0}C in January to 25.67^{0}C in June/July (Figure 1 and Appendix 1). Temperature distribution in the hill is not uniform. The altitude affects on the distribution of temperature. The lower part of the study area is warmer than the higher elevation.

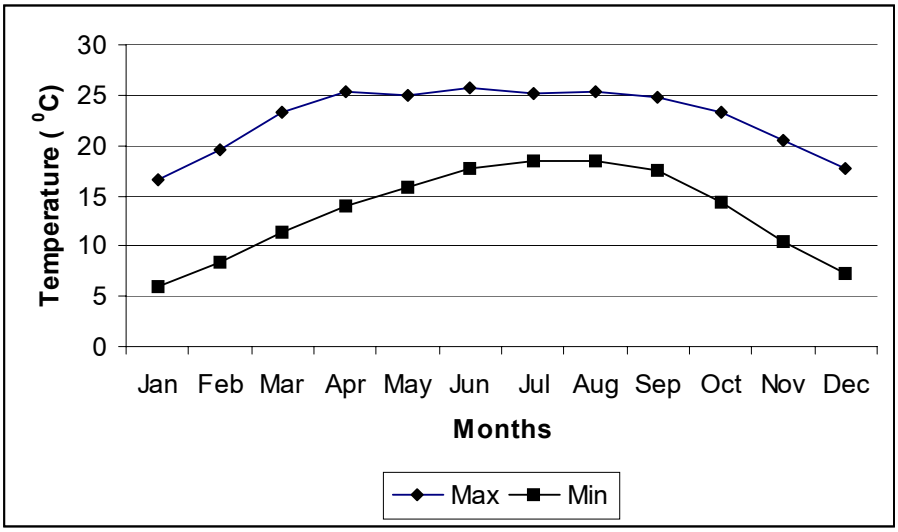


Figure 1: Mean Monthly Temperature Recorded at Pokhara Airport (2000-2004).

This area lies at base of Annupurna range and close to Pokhara valley (Gautam 1999). The mean annual rainfall was 4222.08mm from 2000 to

2004. The mean monthly rainfall ranged from 7.02mm in December to 797.05mm in August (Figure 2 and Appendix 2). There occurs occasional rain in March and April. These rains are pre-monsoon rain. Post monsoon rain exists of course in autumn. November and February are dry Months.

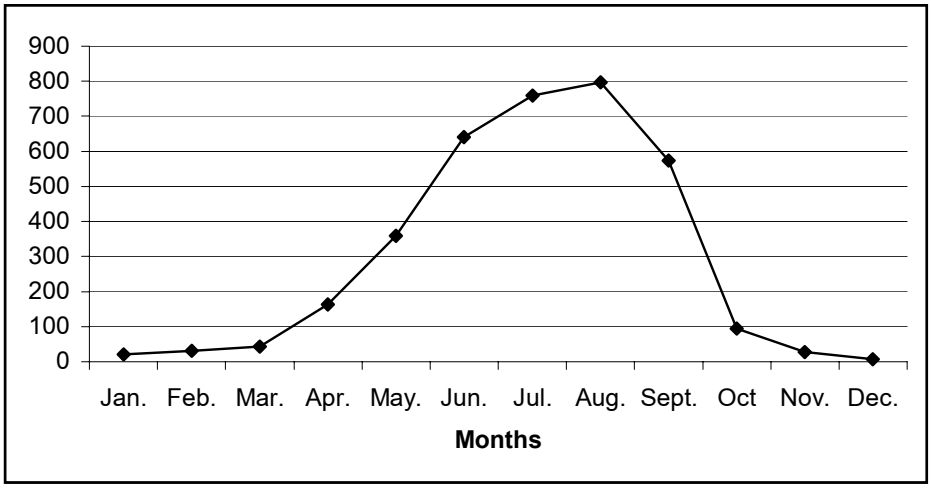


Figure 2: Average Monthly Rainfall Recorded at Pokhara Airport 2000-2004).

In Pokhara valley mean monthly relative humidity ranged from 68.97 in April to 90.75 in January (Figure 3 and Appendix 3).

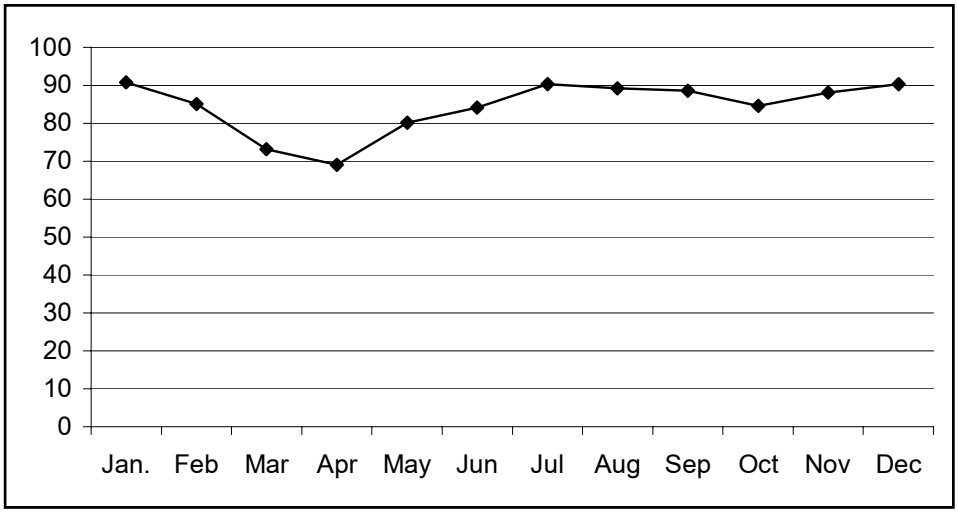


Figure 3: Mean Monthly Relative Humidity Recorded at Pokhara Airport (2000-2004).

2.4 Forest and Vegetation

The vegetation of Hemja area is largely represent mid hill vegetation which is dominated by *Schima-Castanopsis* forest (Stainton 1972). The *Schima-Castanopsis* is the characteristic features of subtropical forest in central Nepal. S*chima wallichi* and *Castanopsis indica* are dominant vegetation and other associated tree species of the study area are *Albezzi* sp., *Alnus nepalensis, Angelhadia spicata, Castanopsis indica, Daphiniphyllum himalayanse Dodecadenia* sp*., Eurya acuminata, E. cerasifolia, Letsea cubibe, Lyonia ovalifolia, Michilus* sp*., Myrica esculenta, Rhododendron arboreaum, Semecarpys ancurdium etc.*

Among the shrubs *Asparagus racemosus, Beraberis asiutica, Grandinia palmata, Machyura cochinchinensis, Maesa sp., Melastomala normale, Mycatanthes arborlristis, Rubus ellipticus* are commonly found in the Hemja area. Similarly, common herbs are *Aachyranthus aspera, Alternathera sessilis arisaema tortotuosum, Atimesia vulgaris, Eupatorium, adenophorum Haulluynia crodata, Nasturtium Officinale Nephrolepis cordifolia, Oxalis cornicalata, Polystishum nepalense,* etc.

2.5 Fauna

Faunal inventory in the study area is still to be done. The study area is inhabited by some medium and small sized mammals. Common mammalian species of study area includes Rhesus Monkey (*Macaca mulata*), Common langur (*Presbytis entellus*), Common Mongoose (*Herpestes edwardsii*), Purcupine (*Hystrix indica*), barking deer (*Muntiacus muntjack*), Jungle cat (*Felis chaus*), Jackal (*Canis aures*), Common leopard (*Panthera pardus*). Some of the common bird species are common mayna (*Acridtherus tristis*), Red vented bulbul (*Pycononotus barbatus*), whistling thrush *(Streptopelia chinensis*), Jungle crow (*crovus macrorhynchus*), Barbet (*Megalaima* sps.), etc. Many common snakes are found in the study area.

2.6 Human Settlement and Agriculture

There are many settlements around the study area. Major dense villages are suikhel, Majbhatti, milan chowk, Humanchowk and Sera. The local inhabitants are Brahmin, Chhetri, Damai, Sarki, Gurung, Kami, Sunuwar, Magar, tamang, Newar, Gharti.

The people of this area are mainly depending on agricultural practices. Crop cultivation is supplemented by animal husbandry. Agriculture is totally depending on rainfall. Whether or not suitable for agriculture, forest areas and natural wasteland continually fall to the axe due to the demand for more land for subsistence agriculture. People of Hemja VDC earn cash by selling vegetable Grown in their farms. Villagers sell their product like potato, cauliflower, cabbage, spinach, pea, tomato, reddish, carrot. Soil of Hemja is very productive in comparison to other neighbor VDC. They earn money also from poultry. Some ethnic people such as Gurung, Magars and Tamang earn Money by selling home made alcohol.

The Major crops cultivated in the region are Rice (*Oryza sativa*), Corn (*Zea Mays),* Wheat (*Triticum aestivum)*, Lentil (*Lens esculenta*), Mustard (*Brassica compestris*) etc.

3. METHODOLOGY

3.1 Reconnaissance Survey

A preliminary field survey was made during the month of May 2006 to select sampling sites. Survey method was included site visits and interaction with local people. Sites representative of different habitat types with adequate possibilities for observing Nepal Kalij pheasant was selected. Local Villagers were interviewed to obtained information on Kalij area in Hemja area of Kaski.

3.2 Field Survey

The field survey was carried out to collect data on population, habitat selection and conservation threats of Kalij pheasant from May 2005 to April 2006. Binocular was used as a visual aid.

3.2.1 Population Census

Population size of the Kalij was determined by roost survey method. Simple presence and absence in different habitats may be the only way of collecting meaningful data whereas dawn and dusk be the best time to census many cryptic birds (Bibby et al., 2000). In the daytime visit, roost of the Nepal Kalij was observed and marked. Roost site was confirmed on day visit to the site observing droppings in the forest floor under the roosts site and population count was made in dawn or dusk time. In roost survey method, counting birds at roosts, involved direct counts of the bird's present, even unstructured, informal interviews was used to provide observers with and idea of species that could be expected before visiting the area (Bibby et al., 2000). Flock size, particular tree species and roosting sites were noted. A monthly population density was determined. Only visual records were included for calculation. Altogether eight visits were made for population census. A total of 2.57 km^2 of Kalij visibility area was included for calculation.

$$\text{Kalij pheasant density} = \frac{No.of\ Kalij\ Observed}{Area\ Covered} = \text{Kalij per Kilometer}$$

3.2.2 Habitats

3.2.2.1 Habitat Classification

Using literatures and field survey data the habitat types of the study area was classified. Classification of habitat largely based on the vegetation structure and land use.

3.2.2.2 Vegetation Sampling and Identification

Quadrate of 10x10m size was randomly laid down for trees in four different sites of study area. A total of 32 quadrates were laid down eight quadrates in each sites: Melbot, Madi danda, Bastola mandir and Sera. All the trees with girth at breast height > 10cm were measured. Trees were identified in the field. Unidentified vegetation was protected by preparing herbarium and was taken to national Herbarium Godawari, Lalitpur for identification. The total number of trees in each sample was counted. From the data obtained by this method, the density, frequency was calculated. Frequency is the number of sampling unit (%) in which a particular species occurs. Thus frequency or each species was calculated with following formula (Rao and Gupta 1998).

$$\text{Frequency (\%)} = \frac{\text{Total number of quadrates in which species occurs}}{\text{Total number of quadrates studied}} \text{x}100$$

3.2.2.3 Habitat Use

Habitat use of Kalij was analyzed by observing animal in various habitats.

a. Line Transect Method

Four transects each with 1.16 km of total length were established through all available habitats. The portion of transect in each habitat type was not equal, where 21.25% of transect was traversed in terraced field, 36.28% in closed

forest with high under storey, 28.57% in closed forest with low under storey and 13.90% was in open forest. All the four types of habitat were traveled along the line transect to assess habitat utilization by *Lophura leucomelana leucomelana*. The population of Kalij pheasant was counted by direct observation through transects. Three different blocks of time were set for observation; 0600-0900, 1100-1400 and 1500-1800 to assess habitat use and record other associated behaviors of birds.

b. Habitat Use and Preference

All the habitat components were recorded where Kalij and their nests, roosting sites observed. The habitat preference was analyzed by using habitat rating index (HPI). HPI was prepared by dividing the percentage of animals observed in each habitat types by percentage to transect traversed in each habitat (Mishra 1982)

$$\text{HPI} = \frac{\text{Percentage of animals observed in habitat type}}{\text{Percentage of transect traversed in each habitat type}}$$

3.3.3 Roost Analysis

The Nepal Kalij pheasants generally roost on the branches of trees at night. For the confirmation the roost in tree, accumulation of droppings below the perch (WPA 1980) was observed. The roost tree species, height of tree, girth at breast height, condition of tree (either alive or dead), and height of lowest branch from ground was recorded. The total height of trees and height of lowest branch was roughly recorded and girth at breast height was measured by using measuring tape.

3.3.4 Questionnaire Survey

A set of questionnaires were prepared with several options for local household survey (Appendix 4). The questionnaires survey was conducted in four wards of Hemja VDC to gather information on the threats on Kalij. List of households

was obtained from the village profile. A total of 20% households were selected randomly without replacement basis from the list in each ward.

Table 1: Name of sampled ward and Name of the villages in the study area

Ward No.	Name of Village	Total	Sample
5	Hanumaan chowk	144	30
6	Sera + Kalika chowk	323	65
7	Milan chowk	136	28
9	Melbot	259	52

Questionnaire Survey was conducted by individual questionnaire method. Prior to survey, respondents were briefed about the purpose of the study. Survey was taken meeting 186 households in group visiting in grazing area and in their home. In the field, before actual data collection from the locals, I was acquainted with their feeling about Kalij and shed light of my aim of study. Afterward with the support of opinion of local leader, I was able to collect my questionnaire completely and satisfactorily.

Each respondent was asked to rank their view on issues then a total score for each option was obtained adding the scores for that option by each respondent , then percentage for each was calculated as recorded score divided by the maximum possible score that the option could have (Bhatta 2002).

4. RESULTS

4.1 Population Status of Kalij

A total of 103 individuals of Kalij were counted in eight visits during this study period. Monthly count ranged from 5 individuals in March to 23 individuals in October (Table 2).

Table 2: Monthly Variation in Population and Population Density of Kalij in Hemja, Kaski (2005- 2006)

Months	Number	Density (No/km^2)
August	8	3.11
September	15	5.83
October	23	8.95
November	20	7.78
December	10	3.90
January	12	4.67
February	10	3.90
March	5	1.94

The population density of the Kalij in Hemja was highest in the month of October (8.95/km^2) and lowest is in March (1.94/km^2) (Figure 4).

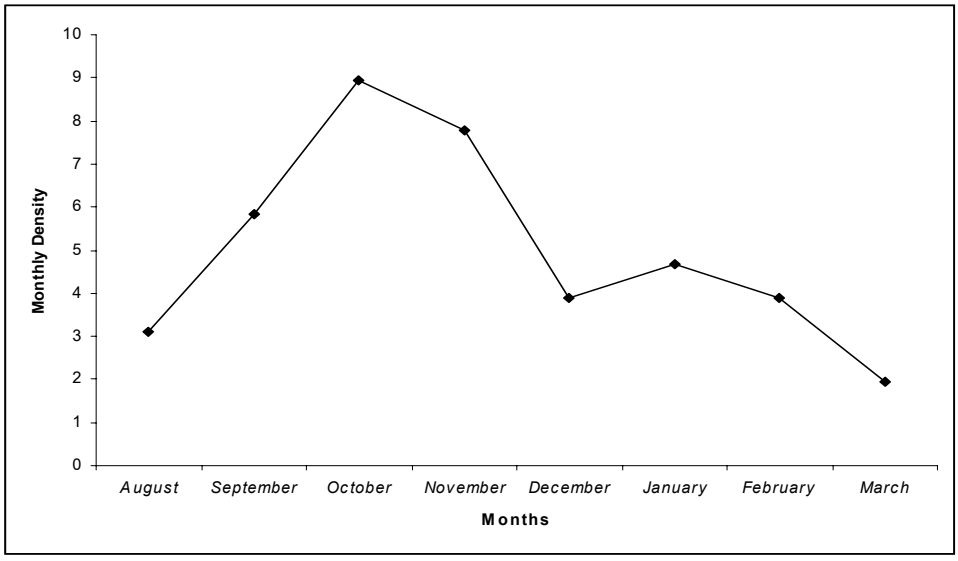


Figure 4: Monthly Variation in Population Density of Kalij Pheasant in Hemja Kaski

4.2 Habitats

4.2.1 Vegetations

Vegetation of the Nepal Kalij habitat in Hemja consists of mixed grasses and herbs, climbers and shrubs and trees. A total of 27 species of trees, 8 species of shrubs and 29 species of herbs were identified (Table 3).

Table 3: Recorded flora in the Habitat of *Lophura leucomelana leucomelana* in Hemja, Kaski

A. Tree Species

	Tree species	Local name	Family
1.	*Albezzia* sp.	Siris	Legumibnosae
2.	*Alnus nepalensis*	Uttish	Betulaceae
3.	*Angelhadia spicata*	Mauwa	Butaraceae
4.	*Artocarpus lokooche*	Badhar	Horaceae
5.	*Bauhinia malabarica*	Tanki	Leguminosae
6.	*Bombax ciebal*	Simal	Bombacaceae
7.	*Brassiopsis hainla*	Chuletro	Araliaceae
8.	*Castanopsis indica*	Katush	Pheagaceae
9.	*Daphiniphyllum himalayanse*	Rat chandan	Daphiniphyllaceae
10.	*Dode cadenia* sp.	Bakle	Lauraceae
11.	*Eurya acuminate*	Jhyno	Theaceae
12.	*Eurya cerasifolia*	Pate	Thea ceae
13.	*Ficus bengalenses.*	Bar	Moraceae
14.	*Ficus clavata*	Bedal	Moraceae
15.	*Ficus glaberrima*	Pakhur	Moraceae
16.	*Ficus lacor*	Kavro	Moraceae
17.	*Ficus religiosa*	Pipal	Moraceae
18.	*Ficus uriculata*	Wibro	Moraceae
19.	*Litsea cubeba*	Siltumur	Lauraceae
20.	*Litsea monopetala*	Kutmiro	Lauranceae
21.	*Lyonia ovalifolia*	Thagne	Ericaceae
22.	*Michilus* sp.	Kaulo	Lauraceae
23.	*Myrica esculenta*	Kafal	Myricaceae
24.	*Rhododendron arboreaum*	Gurash	Ericeae
25.	*Schima Wallichii*	Chilaune	Theaceae
26.	*Semecarpus anacurdium*	Bhalayo	Anacordiaceae
27.	*Syzygium cumins*	Jamun	Myrtaceae

B. Shrub species

S.N.	Species	Local name	Family
1.	*Asparagus racemosus*	Kurilo	Lihaceae
2.	*Berberis asiutica*	Chutro	Berberidaceae
3.	*Grandinia plamata*	Sishnu	Urtcaceae
4	*Maclura cochinchinensis*	Dammaru	Moreceae
5.	*Maesa sp.*	Bilaune	Myrsinaceae
6.	*Melastomala normale*	Gruiye Angeri	Lecythidaceae
7.	*Mycatanthes arborlristis*	Rudilo	Uleaceae
8.	*Rubus ellipticus*	Aiselu	Kosaceae

C. Herb species

SN.	Species	Local name	Family
1.	*Rhus javanie*	Hadgunio	Anacardiceae
2.	*Renwardtia Indica*	Pyauli	Linaceae
3.	*Pteris biaurita*	Guesotara	Pteridaceae
4.	*Polystichum mepalense*	Paniamala	Aspidiaceae
5.	*Phyllanthus niruri*	Bhui Aushely	Euphoribiaceae
6.	*Phyllanthus clarkei*	Paite	Euphorbiaceae
7.	*Oxalis Corniculata*	Charimilo	Oxalidaceae
8.	*Pephrolepis Corniculata*	Paniamala	Davalliaceae
9.	*Nasturtium officinale*	Kholesug	Cruciferae
10.	*Inula cappa*	Gaitihar	Compositae
11.	*Achyranthus aspera.*	Dattiwan	Amaranthaceae
12.	*Altermanthera Vessilis*	Akhlejhar	Amarnthacea
13.	*Arisaema tortateiosum*	Sharpalo Makai	Araceae
14.	*Alimesia vulgaris*	Pati	Compositae
15.	*Boehmeria humiltoniane*	Gaulato	Urticaceae
16.	*Capsella bursapastris*	Tori jahr	Cruciferae
17.	*Centella asiatica*	Ghod tapre	Umbelliferaeac
18.	*Colocasia antiquorus*	Karkalo	Araceae
19.	*Crassocephalum crepidioides*	Shalahajhar	Compositae
20.	*Cynoglossum zeylanicum*	Setpate	Boraginaeae
21.	*Drymaria diandra Blume*	Avijalo	Caryophyllaceae
22.	*Dryopteri filixmax*	Uinu	Polypodiaceae
23.	*Dryopleris coehleuta*	Niuro	Polypodiaceae
24.	*Duchesnea Indica*	Bhuikaful	Rosaceae
25.	*Eupatorium adenophrum*	Banmara	Compositae
26.	*Gleichenia gigantean*	Hadgunio	Gleicheniaceae
27.	*Gonostegia Hirta*	Aternu	Urticaceae
28.	*Haulluynia cordata*	Gandhe	Sauraniaceae
29.	*Hedychium* sp.	Paniswaro	Zingiberaceae

4.2.1.1 Vegetation Characteristics

The density of trees was 170000/km^2. Most frequent species were *Schima wallichi* (96.57%) followed by *Castanopsis indica* (85%), *Alnus nepalensis, Myrica esculenta*, *Dodecadenia* sp., *Lyonia ovalifolia* (Table 2). Species like *Semecarpys anacurdium, Albezzi* sp. *and Michilus* sp are represented with low frequency.

Table 4: Frequency of Tree species

Specie	Frequency (%)
Schima wallichii	96.57
Casranopsis Indica	85
Alnus nepalensis	42.29
Myrica esculenta	40.96
Eurya Cerasifolia	37.64
Dodecadenia sp	35.63
Lyonia ovalifolia	32.33
Daphiniphyllum himalayanse	17.65
Angelhadia spicata	12.32
Eurya acuminita	10.32
Rhododendron arboreaum	8.99
Letsea Cubibe	7.99
Michilus sp	5.66
Albezzi sp.	4.33
Semecarpys anacurdium	4.33

4.2.2 Habitat Classification

Four types of habitats; Closed Forest with High Under storey (CFHU), Closed Forest with Low Under storey (CFLU), Open Forest (OP), and Terraced Field (TF) have been recognized in the study area.

4.2.1.1 Closed Forest with High Under storey (CFHU)

The CFHU is mixed forest of *Schimma-Castanopsis* with high under storey along with dense shrubs, grasses and pteridophytes. This forest is characterized by high canopy coverage and less affected by human activities.

4.2.1.2 Closed Forest with Low Under storey (CFLU)

This forest is a mixed forest of *Schima* - *Castanopsis*, and consists of low under storey with little shrub cover. There is good canopy coverage but lowers strata are highly affected by human activities.

4.2.1.3 Open Forest (OF)

This included thinner *Shima*-*Castanopsis* trees and treeless meadows. These were rich in grass cover and had low tree and shrub cover.

4.2.1.4 Terraced Field (TF)

The terraced fields were confined to the vicinity of villages, where villagers largely cultivate maize, wheat and paddy.

4.2.3 Habitat Use

The Nepal Kalij pheasants were found to use all the available habitat types. A total 103 individuals of Nepal Kalij pheasants were observed during study period in all the four habitat types (Table 5).

4.2.3.1 Closed forest with high under storey (CFHU)

CFHU habitat was most frequently used by Kalij pheasants in Hemja area. About 44 % of the total Kalij observed in this habitat.

4.2.3.2 Closed forest with low under storey (CFLU)

Altogether 28 individuals were observed in this habitat during study period.

4.2.3.3 Open Forest

Altogether 12 (11.66%) individuals were observed in this habitat type.

4.2.3.3 Terraced Field (TF)

In TF habitat only 17 individuals of Nepal Kalij pheasants were observed. In terraced field Nepal Kalij was mostly seen in morning in between 0600 to 0900 and evening in between 1500 to 1800 hours. In this time Kalij came in terraced field for feeding.

4.2.4 Habitat Preference Rating Index

The habitat preference rating index also shows the highest preference towards CFHU (1.23) followed by closed forest with low under story (0.95) open forest (0.83) and terraced field (0.78) (Table 5)

Table 5: Nepal Kalij Pheasant Habitat Preference Index (HPI)

Habitat Type	Number of Kalij	X* %	Y#%	HPI^ (X/Y)
Closed Forest with high under storey (CFHU)	46	44.66	36.28	1.23
Closed forest with low under story (CFLU)	28	27.18	28.57	0.95
Open forest (OF)	12	11.66	13.90	0.83
Terraced field (TF)	17	16.60	21.25	0.78
Total	103			

*X = Percentage of animals observed in each habitat types.

#Y = Percentage of transect traversed in each habitat type

^HPI = Habitat preferences rating index.

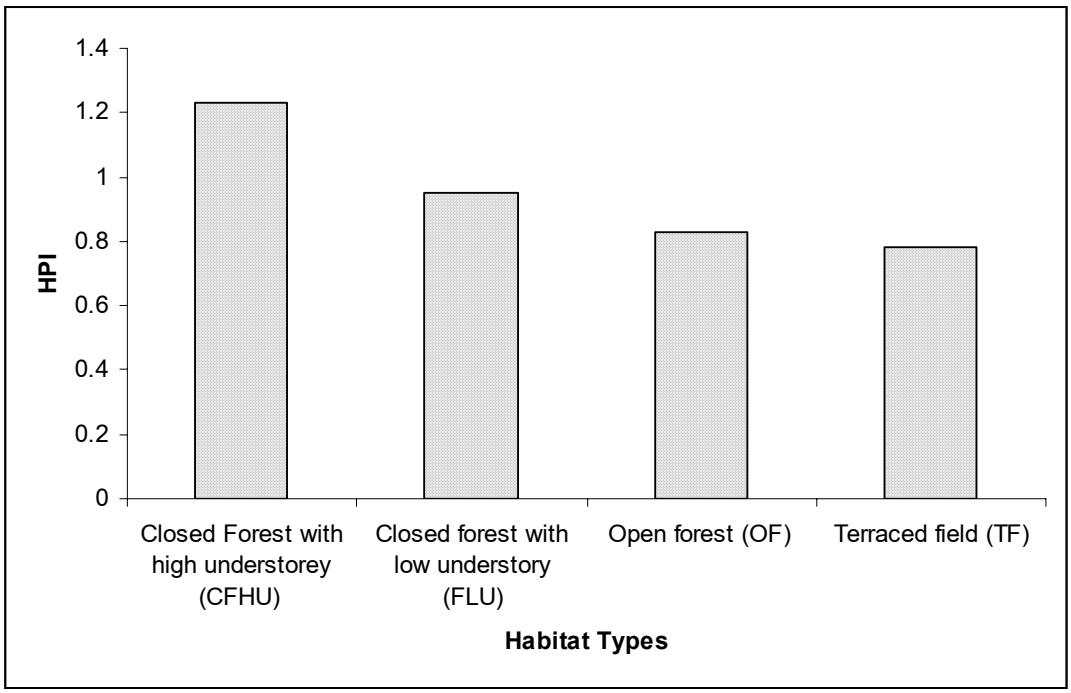


Figure 5: Habitat Preference Rating Index (HPI) of Nepal Kalij Pheasant in Hemja, Kaski.

4.3 Roost Analysis

4.3.1 Roosting behavior

Nepal Kalij is communal rooster usually roosting in a group. They usually returned to the roost about sunset and showed strong site fidelity to roost, utilizing the same branch of tree for many days. The roosting group of Kalij pheasant saw 1 to 5 individual.

4.3.2 Roost Habitat Selection

During this study, a total 34 roosting trees belonging to four species were recorded. Among the trees, 27 were *Castanopsis indica*, 5 *Schima wallichii*, 1 *Angelhadia spicata*, 1 *Myrica esculenta* (Table 6).

Table 6: Characteristics of Roost trees of the Kalij in Hemja, Kaski

S. N.	Tree species	Height of tree (m)	Girth to breast height (m)	Height of lowest branch (m)
1.	*Castanopsis indica*	7	0.85	5.5
2.	*Castanopsis indica*	9	0.35	5.5
3.	*Castanopsis indica*	8	0.40	5
4.	*Castanopsis indica*	6	0.45	4
5.	*Castanopsis indica*	7	0.50	4
6.	*Castanopsis indica*	7	0.65	4.5
7.	*Castanopsis indica*	7	0.65	4.5
8.	*Castanopsis indica*	8	0.85	4.5
9.	*Castanopsis indica*	6	0.25	4.5
10.	*Castanopsis indica*	7	0.50	4.5
11.	*Castanopsis indica*	6.5	0.64	5
12.	*Castanopsis indica*	7	0.30	5
13.	*Castanopsis indica*	6	0.35	4.5
14.	*Castanopsis indica*	6	0.25	4.5
15.	*Castanopsis indica*	8	0.25	6
16.	*Castanopsis indica*	6	0.30	4.5
17.	*Castanopsis indica*	8	0.25	6
18.	*Castanopsis indica*	6	0.30	4.5
19.	*Castanopsis indica*	6.5	0.31	4
20.	*Castanopsis indica*	7.5	0.60	4.5
21.	*Castanopsis indica*	7.5	0.39	6
22.	*Castanopsis indica*	8	0.57	5
23.	*Castanopsis indica*	7	0.40	4.5
24.	*Castanopsis indica*	6	0.50	4.5
25.	*Castanopsis indica*	7	0.40	5
26.	*Castanopsis indica*	6	0.35	4.5
27.	*Castanopsis indica*	8	0.50	6
28.	*Schima Wallichii*	7	0.40	2
29.	*Schima Wallichii,,*	8	0.65	6
30.	*Schima Wallichii,,*	7	0.90	5
31.	*Schima Wallichii,,*	8	0.50	3.5
32.	*Schima Wallichii,,*	12	0.80	5
33.	*Myrica esculenta*	9	0.48	6
34.	*Angelhadia spicata* Mean (x)	8 7.294	0.3 0.474	5 4.79

The Nepal Kalij showed a strong preference toward *Castanopsis indica* tree for the selecting of roost. About 80 % of the Kalij in Hemja found to be used *Castanopsis indica*. The mean height of *Castanopsis indica* was 7 meters (m), girth at breast height (gbh) was 0.44m and mean height of lowest branch (hlb) was 4. 83. *Schima wallichii* 14.70%, *Myrica esculenta* 2.94%, *Angelhadia spicata* 2.94% were used in the study area (Table 8).

Table 7: Roosting trees of Nepal Kalij in Hemja

Species	Total	%	Mean height (m)	Girth at breast height (m)	Height of lower branch (m)
Angelhadia spicata	1	2.94	8	0.30	5
Castanopsis indica	27	79.41	7	0.44	4.83
Myrica essculenta	1	2.94	9	0.48	3.5
Schima wallichii	5	14.70	8.4	0.65	4.8

4.4 Conservation threats

4.4.1 Perception of Respondents on threats to Kalij

During questionnaire survey the respondents were asked to rank their perceptions on the threats to Kalij. The feeding habit of Kalij in agricultural field ranked highest value (96.23%) followed by firewood collection, disturbance by people in the roost, timber collection, poaching, egg collection, grazing (Table 8 and Figure 6).

Table- 8: Household survey in the wards of Hemja VDC (in %)

Cause of threats	Ward Number				
	5	6	7	9	Total (n=168)
Feeding of Kalij on crop	96.12	97.30	95.37	96.13	96.23
Fire wood collection	94.25	95.16	96.28	95.31	95.25
Disturbance by people	90.12	95.27	96.37	95.18	94.23
Timber collection	94.12	93.12	90.18	91.23	92.16
Poaching	90.35	91.42	89.34	80.67	87.94
Egg Collection	50.12	40.73	35.18	36.78	40.70
Livestock Grazing	30.25	32.31	36.12	25.13	30.95
Total household	114	323	136	259	
Surveyed household	30	65	28	52	
Maximum Point for each ward	210	455	196	364	

* The percentage of ranking is calculated as total points scored by an individual option are divided by total points that option could have x 100 (Bhatta 2002)

Ranks are valued as R_1=7, R_2=6, R_3=5, R_4=4, R_5=3, R_6=2, R_7=1, and so on.

4.4.1.1 Feeding of Kalij on Crop

Kalij feeding in the crop field is a serious cause of conflicts between man and Kalij. Among 168 respondents, 94.05% express negative attitude towards Kalij, because of its feeding behavior in the agricultural fields. Many of them wanted to eliminate the Kalij. Thus it became a great threat to Kalij.

4.4.1.2 Firewood Collection

In Hemja area, the firewood is main source energy. They bring fire wood from forest. Some ethnic people use firewood to prepare alcohol in their home and need extra energy. Fire wood collection caused habitat degradation and disturbance to Kalij.

4.4.1.3 Human Disturbances

Human activities in the forest such as collection of forest resources, livestock grazing and using forest trails disturbed the habitats and daily activities of the Kalij.

4.4.1.4 Timber Collection

Occasionally people are allowed to collect timber from the community forest. Local people are not aware about the conservation thus they cut trees of their need or easy to carry. Some times they fell down even the roost tree of Kalij. Over 90% of respondents' informants said tiber harvest is a threats to conservation.

4.4.1.5 Poaching

People in the study area informed there is poaching of Kalij using tools such as snare; catapult but now a days use of gun is scarce in the area. About 87% of the respondent informed that the poaching of Kalij threats its survival.

4.4.1.6 Egg collection

About 40 % of respondents informed, local people collected eggs of Kalij and such activities also affects the survival of Kalij.

4.4.1.7 Livestock Grazing

The grazing area (forest and grass land) is foraging area for Kalij, thus livestock grazing also disturbed habitat and feeding activity of the Kalij.

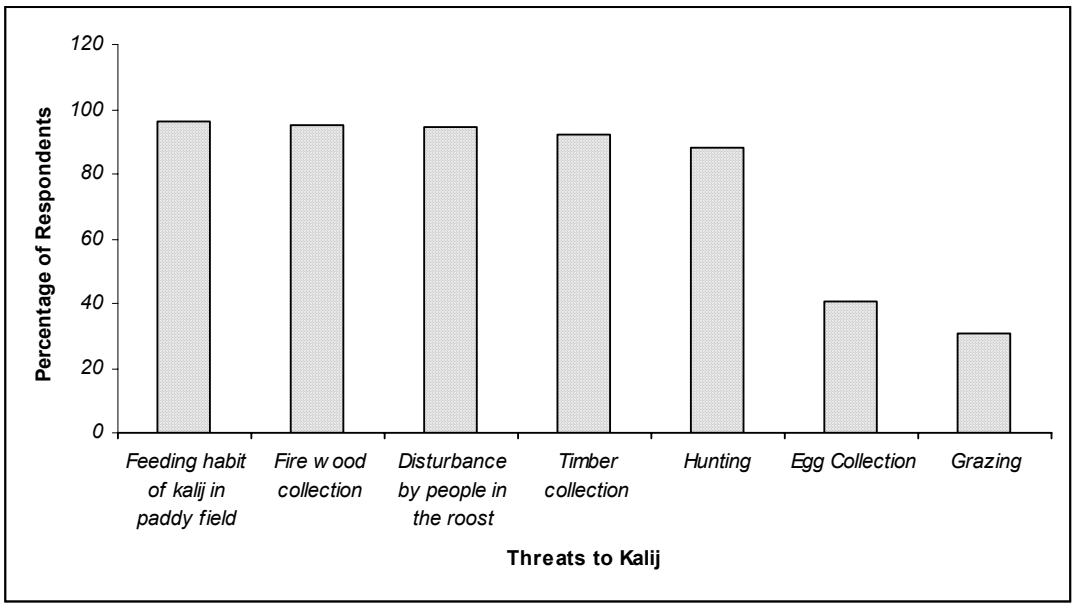


Figure 6: Response of local people on threats for Kalij pheasants

4.4.1.8 Attitude of Respondents

Among 168 respondents, 94.05% respondents express negative attitude towards Kalij (Table 9), because of its feeding behavior in the agricultural fields many of them wanted to eliminate the Kalij which was the great threats to Kalij pheasant

Table 9: Household Survey in the Wards of Hemja VDC (in %)

Attitude of local people	Ward Number				
	5	6	7	9	Total (n=168)
Negative Attitude	95.13	94.29	96.56	90.23	94.05
Positive Attitude	4.87	5.71	3.44	9.77	5.94

5. DISCUSSION

5.1 Population Status

A total 103 individuals of Kalij were recorded from Hemja area during the study period. Highest monthly density of Nepal Kalij pheasant was found in October (8.95/km^2) and least density was estimated in March (1.94/km^2). There is no previous study on the population density of Kalij pheasants in Nepal, but some researchers have estimated population density of Cheer pheasant in the Annapurna range. The estimated population density of Blood pheasant ranged from 2.6 to 3.9 pairs/km^2 in Pipar (Lelliott and Yonzon 1980) and the estimated breeding population density was 4.42 birds/km^2 in the Lower Kaligandaki valley, Mustang (Acharaya 2004). Similarly, Gaston and Shigh (1980) found 6 pairs of Cheer pheasant per sq. km. in Chail Wildlife Sactuary, Himanchal Pradesh., India. Thus, the population of Kalij pheasant is comparable to the Cheer.

The population density of the Kalij in Hemja area fluctuates with months. During the months of the September, October and November high number of Kalij was found, these months are favorable for Kalij sighting. Highest number was recorded in October because this month may be the most favorable time for Kalij. Breeding season starts from April through June (Baker 1930) and October was post breeding season. They may easily found feeding ground, roosting tree and other. In this month they were found in large family parties. They move greatly for foraging. Mobility of Kalij for foraging was higher in September and November. While in March least number (5) of Kalij was found. Because breeding season start after this month (Ali and Ripley, 1969). So in this month they start to pair. Because of no chance to see large flocks in this month, there was low density in this month. In some occasion even single male or female was found .They engaged in nesting and hiding. But in August density of Kalij was recorded higher than in March and lower than in other months because they didn't come totally out from nesting and breeding ground.

New babies were not come out from nest for foraging. In December, January and February, the result showed higher density than in March because in these month were came to agricultural field for feeding grains, left after harvest by respondents in early morning and evening.

5.2 Habitat Selection

Habitat selection is an integral part of wild animals. Adequate habitat consists of suitable breeding ground, resting place, enough drinking water and plenty of food species, which always provide an opportunity to wildlife to increase and maintain their number (Bhatta 2002). The adaptation of each species suits it to a particular habitat and rule out its use of other places (Gautam 1999).

In my study area there was presence of different types of habitat. But Nepal Kalij were recorded high percentage (44.66%) in CFHU and least in OF (11.66%) and in TF(16.60%).Similar result was found by Gautam (1999) .He found 49.42%of Kalij in CFHU and least 10.34% in OF and in TF(12.64%) in Dhital VDC, Kaski, Nepal. Mishra (1996) also found similar result in Majhatal Harasang wildlife Santuary, India. In his study he found 35%of Kalij in CFHU and least in TF (19%). Ali and Ripley (1983) mentioned that the Nepal Kalij were utilized affected forest with heavy scrub undergrowth and partial to the neighborhood of water and terraced cultivation. The highest habitat preference rating index (HPI) for Nepal Klalij in Hemja was found in CFHU (1.23) and least in TF (0.78).Similar result was found by Gautam (1999) in Dhital,VDC,Kaski, Nepal .He recorded 1.44 for CFHU and OF(0.72) and TF(0.55).

Nepal Kalij prefers CFHU because it could found suitable breeding ground, resting place, food species and place to hide from the predator. It could found easily favorable condition in this habitat. Cover is an important feature of habitat for pheasants because it provides protection against predators and inclement weather and safety for breeding hens (Severinghaus 1978-79), which Nepal Kalij could found in CFHU. But It uses least the TF and OF.

Comparatively low preference of TF and OF habitat could be more risk to the animals by the ground predators as well as flying birds (Gautam 1999). In this habitat there was low chance to find favorable condition for this species. Other possible factors might be disturbance by cattle grazing and human activities for example grass and wood collection (Gautam 1999).

5.3 Roost Analysis

In my study area I recorded out of 34 roost trees 27 were *Castanopsois Indica*. In Hemja most frequent species was *Schima wallichi* (96.57%) but this species was less in use (14.70%) by Kalij than *Castanopsis indica* (79.41%).*Castanopsis indica* was recorded highly used species by Kalij because this tree has high canopy and crown. It contains more branches scattered horizontally, which provided perch branch to Kalij. Because of high crown and canopy predator couldn't found easily the Kalij roost in the tree. Gautam (1999) also recorded the bark may provide easy perching, which is another reason of its preference. Similar type of study was done by Gautam (1999) in Dhital VDC, Kaski, Nepal .He found 35 roost trees. Among them 29 were *Castanopsis indica.* Frequently used species was *Schima wallichii* equal to 96.57% but roosting value of this species has only 5.71 % of total study area.I recorded higher value than this could be due adaptation of Kalij in Hemja. Whereas frequency of *Castanopsis indica* has only 80% but roosting frequency accounted 85.85% among the total roosting trees.

Kalij in Hemja used the trees for roost which was with the mean height 7.29m,girth at breast height 0.47m and height of lowest branches 4.79m.Kalij choosed this parameter because it could found favorable condition such as to hide from predator and able to be out from the environmental risks. Rutgers and Norris (1970) described the roosting perches of Nepal kalij were 6 feet above the ground and safer from heavy rain and storms but this was for captive. So the value is lower then my observation similar result was found by Gautam (1999). He recorded Kalij used roost tree with mean height 11.63m, girth at breast height was 0.66m which was higher than my study may due to

topography of the study area. But height of lowest branch was 4.21m.seemed to be lower than my study could be due adaptation in roost selection and slope of the study area.

Similar type of Study was done by Islam and Crawford (1984-1985) on western Tragopan in Northeastern Pakistan; they recorded 28m tall with 2.1m diameter at breast height 3m height of lowest branch from the ground which are taller and bigger than the roosting tree of Kalij in Hemja ,could be due to some different behavior of Tagopan in selection of roost tree. Yasmin (1993/94) recorded Dalbergia sissoo and *Albizzia lebbeck* were preferred by blue peafowl in Aligarh District India. He found height trees was 12 to 13 meter and height of first branch of tree was 3 to 5 meters could be due to achieve the greater protection and being the different species from Kalij. Other large birds such as Turkeys (Hoffman, 1968) and vultures (Thompson et al. 1990) also use old and mature trees with the greatest height. Predation can be major population control mechanism in gallinaceous birds (Hill and Robertson, 1988) and roost tree selection is most probably influenced by predation.

During my field visits ,1 to 5 flock size was recorded .I found even single male and female .The single male might be replaced by another competent males or it is the rest one which could escape from the hunt (Gautam 1999). Might be female also at rest or escape from predator. Baker (1928) also observed roosting of Nepal Kalij in flocks.

5.4 Conservation Threats

The Nepal Kalij in Hemja has suffered directly or indirectly by man. Some of the major threats were feeding of Kalij on crop which made to arise negative attitude of local people towards them, firewood collection, and disturbance in the roosts of Kalij, timber collection, poaching, egg collection, and grazing.

Feeding habit of Kalij on crop was found to be most important threat to this species. Local people of Hemja area showed negative attitude towards Nepal

Kalij, because Kalij come to their agricultural field for feeding. Attitude of local people play important role in the conservation of wildlife. In Langtang National Park, Adhikari (2004) recorded Snow leopard received strong negative reflection from the local peoples in its conservation.

Firewood and Timber collection were other important threats to Kalij in Hemja. It was also mentioned for this species in Dhital by Gautam (1999). Most of the respondents use firewood as a source of energy and respondents brought firewood and also timber (once in a year) from habitat of Kalij which brought disturbance in the habitat of this species. Forests were cleared for fire wood and timber collection in Hemja. Deforestation in Hemja created problem for Kalij to find cover. In Royal Bardiya National Park, Bhatta (2002) also recorded cover was one of the basic need for wildlife, shortage of which brought influence in its population.

Disturbance in the roosts of Kalij became other important threat. Because of movement of local people to the core forest for many purposes for example to bring leaves of *Castanopsis indica,* brought disturbance to the roost of Kalij. The Nepal Kalij is literally competing with human Gautam (1999).

Poaching was another threat to Kalij in Hemja. Every Kind of poaching method was found to be practiced on Kalij in Dhital Gautam (1999). Because of insurgency in Hemja, local people didn't have gun, so they didn't get chance to poach Kalij by using gun.

People in Hemja enjoyed with collection of eggs of Kalij, which became threats to this species.

Grazing was the least important threat to Kalij in Hemja. Livestock was allowed to graze freely in forests which have adverse effect to the wildlife as well as the Nepal Kalij (Gautam 1999). The foraging, feeding and roosting habitat could be destroyed by grazing. Local people allowed cattle to graze and browse of the forest's food species once in a year in Hemja which bring threat

to Kalij. For example in western Himalayas of India domestic stock can also cause dramatic alterations to patch work of semi-natural habitats and production mono cultures typical of most agricultural areas which cause the habitat degradation such threat faced by Tragopan in India and Pakistan (Mc Gown 1995-1999). Grazing also could play important role for the conservation of wildlife. Tamang (2000) also recorded that in Royal Bardia National Park there was decrease in number of species mainly due to overgrazing, but in Hemja local people informed they were not allowed to graze cattle all around the year in the community forest for its conservation.

6. CONCLUSION AND RECOMMENDATIONS

The Nepal Kalij (*Lophura leucomelana leucomelana)* is found in the central Nepal. In Hemja a small population of this species is basically confined in densely overgrow steep gullies on the hill slopes of thick cover, partial to thin cover and terraced cultivation.

Monthly fluctuation in population density of Nepal Kalij was found in Hemja, Kaski. Highest density was recorded in October because it is post breeding period of Kalij. Newly borne individuals joined the population. And least in March because Kalij engaged in nesting and started to pair in this period.

From vegetation analysis a total of 27 species of trees , 8 species of shrubs and 29 species of herbs were recorded in Hemja , Kaski .Only 15 species of trees were analyzed to calculate frequency because other were found in very small number. *Schima wallichi* was recorded as a frequent species and followed by *Castanoposis indica, Alnus nepalensis, Myrica esculenta.* Closed forest with high under storey was highly preferred by Kalij in Hemja. In this habitat Kalij could easily found nesting, foraging, roosting and feeding ground. In this habitat it felt secure than other. Open forest was least preferred by Kalij in Hemja. In this habitat, they couldn't found easily favorable condition for feeding, roosting foraging and others. Predator could found it easily in this habitat.

Castanopsis indica was highly used by Kalij for roosting. Average height of *Castanopsis indica* is 7 meters. This tree species provided safe perch to Kalij. They roost on flock of family parties.

Many threats to Kalij were recorded on the basis of information given by respondents. Feeding of Kalij on crop was the most important threat to it. Due to negative attitude of local people towards Kalij, they are not interested to conserve it. Because of not allowing, local people to graze cattle in the study area all around the year, it became least important threat to the Nepal Kalij.

On the basis of this study, I would like to recommend following points:

1. There is no specific information on population status, foraging and breeding habitats of Kalij pheasant, so it is necessary to research on these topics to understand its ecology.

2. Population monitoring of Kalij is essential to estimate population dynamics.

3. Conservation awareness is essential to reduce the negative attitude of local people about Kalij. Thus, various awareness programmes like Conservation education classes in schools, Conservation awareness camps, Study tours and training for villagers should be launched.

4. Timber and firewood collection, disturbance in the roost of Kalij, poaching and cattle grazing in Hemja, area should be controlled with rule and regulation.

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Appendix 1

a. Monthly Mean Maximum Temperature (^{0}C) of Pokhara Valley (2000 to 2004)

Months	2000	2001	2002	2003	2004	Mean.
Jan.	20.6	19.6	20.1	19.7	19.8	16.63
Feb	25.3	23.3	23.4	21.9	23.4	19.55
Mar	29.4	27.9	27.1	25.7	29.3	23.23
Apr	33.6	30.8	29.2	30.1	28.9	25.43
May	30	29.6	29.8	30.2	30.6	25.03
Jun	30.1	30.7	31.4	30.8	31	25.67
Jul	29.3	30.7	30.2	30.5	29.9	25.10
Aug	29.1	30.4	30.3	31.4	31.4	25.43
Sep	29.9	29.8	29.7	30.1	29.4	24.82
Oct	26.6	28.7	28	29	27.3	23.27
Nov	24.3	25.5	24.6	24.7	23.5	20.43
Dec	21.6	21.1	20.9	21.2	21.1	17.65

b. Monthly Mean Air Minimum Temperature (0C)

Months	2000	2001	2002	2003	2004	Mean.
Jan	6.5	7.5	7.1	6.9	7.5	5.92
Feb	10.7	10	9.9	9.6	10.3	8.42
Mar	13.2	12.3	13.7	12.8	15.9	11.32
Apr	18.6	15.4	16.5	16.9	16.6	14.00
May	19.1	19.2	19.3	17.6	19.3	15.75
Jun	20.8	21.6	21.6	21.1	21	17.68
Jul	21.7	22.5	22.4	22.1	22.1	18.47
Aug	21.4	22.2	22.1	22.5	22.6	18.47
Sep	21.4	20.8	20.7	21	21.1	17.50
Oct	17.4	17.8	16.9	17.6	16.2	14.32
Nov	12.7	13.2	12.4	13.3	11.1	10.45
Dec	9.1	8.8	8.9	8.3	8.7	7.30

Source: Department of Hydrology and Meterology, Nepal Government. Pokhara Airport Station of kaski district.

Appendix 2

Monthly rainfall (mm) of Pokhara valley (2000 to 2004)

Year	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sept.	Oct	Nov.	Dec.
2000	10.6	13.3	51.5	199.5	682.9	875.7	1032	1192.4	572.7	136	18.4	0
2001	3	25	15.3	111.7	359.2	711.5	856.4	1521.9	716.1	115.3	77.1	0
2002	44.4	54	61.9	202.1	437.1	703.4	1815.1	693.3	335.4	114	23.5	0
2003	36.6	84.6	100.1	202.6	245.9	785.4	129.8	586	953	17.2	16.9	42.1
2004	31.2	10.9	28.4	265.7	432.5	773	716.9	788.7	864	184.2	33	0
Mean.	20.97	31.30	42.87	163.60	359.60	641.50	758.37	797.05	573.53	94.45	28.15	7.02

Source: Department of Hydrology and Meterology, Nepal Government.

Appendix 3

Monthly relative humidity of Pokhara valley (2000 to 2004)

Months	2000	2001	2002	2003	2004	Mean.
Jan.	88	91.5	90.7	94	92.3	90.75
Feb	80.5	85.8	86.3	89.6	87.4	85.02
Mar	64.3	71	78.9	82.2	78.6	73.22
Apr	59.6	62.3	79.4	74	78.9	68.97
May	83	79.4	82.6	74.1	78.5	80.10
Jun	81.4	87.5	85	85.4	84.1	84.13
Jul	90.3	87.4	92.2	90.4	91.2	90.30
Aug	89.9	91.2	89.9	88.4	86.3	89.27
Sep	88.4	86.7	87.2	89.5	91.2	88.57
Oct	84.5	85	84	83	86.6	84.60
Nov	87.8	88.2	87.2	90.8	87.2	88.17
Dec	88	92.1	91.2	91.5	91.1	90.32

Source: Department of Hydrology and Meterology, Nepal Government.

Appendix 4

Household Questionnaire Survey On Kalij Pheasant In Hemja VDC with Local people.

This questionnaire is being given to find out what people know about Nepal Kalij. You do not have to answer these questions if you do not want to. I will not write your name on the questionnaire and no one will know which answers are yours. Answering the questions will take about 40 minutes. You can skip any questions you like by saying, "skip" or stop answering anything at any time you choose. If you have any questions, you can ask me now or after anything at any time, you choose. If you have any questions, you can ask me now or after anything at any time, you choose. If you have any questions, you can ask me now or after you finish-answering questions. Do you have any questions for me right now about the survey?

Would you like to participate in the survey? (If yes, proceed to ties / 1)

1. Name of interviewer: Interview Date:
2. Village Name (or approximate location) elevation (m):
3. Respondent's Gender: Age: Occupation:
4. Total village population (Number persons/ households):
5. Do you recognize pheasant?
   a. Yes b. No
6. Indicate Kind of evidence found with tick below:
   Droppings _____ Sighting_____
7. Describe the place where the sign was found (e.g. trail, base of tree, terraced field, rocky area, streambed etc.)
8. If a sighting how many Kalij were seen in a group?
9. How is Kalij pheasant like? Describe distinctive physical feature?

10. How many Kalij do you think use this area?

11. Do Kalij come to your agricultural field?

    a. Yes b. No

12. Are they here all year or seasonally?

    a. all year b. seasonally only

13. What is your opinion about Kalij?

    a. Good b. Bad c. No opinion

14. Should they be protected or eliminated and why?

15. Do local people and any kinds of benefits about the Kalij?

16. Have you seen the nest of Kalij?

    a. Yes, b. No

17. If yes, in which habitat is the nest found?

a. Tree (which type) b. Bush c. Ground d. rice field

18. In which season Kalij hatch chicken?

a. Winter b. summer c. Other

19. How many eggs do the Kalij hatch in one hatching? Do you like to collect egg of Kalij?

20. Do the Kalij live with other birds?

21. Are the Kalij poached?

    a. Yes b. No

22. Do the grazing in forest affect the Kalij?

    a. Yes b. No.

23. Do the human activities affect the Kalij?

    a. Yes b. No.

24. Do the forest community group organize some programme for the purpose of conservation of Kalij? If they do so, what type of programme, do they organize?

25. Do NGO's, INGO's, Government run propramme for the conservation of habitat of Kalij and Kalij itself ?

    a. Yes b.No

26. Are the people who poach the Kalij punished?

    a. Yes b.No.

27. If they are punished, what type of punishment do the FCG give?

28. Who poach the Kalij?

    a. Villagers b. out siders c. children

29. Different type of tools used in poaching.

    a. Snare b. catapult c. Gun d. hand catch

(End of Interview): Thank You very much for answering there questions for me. I appreciate your ability to help gather information.