1. INTRODUCTION

1.1 General Background

Phulchowki mountain forest is noted for rich biodiversity and relatively intact habitat within close proximity to the metropolitan city of Kathmandu. It is very attractive and an ideal place inhabited by varieties of flora and fauna because of its unique topographic and climatic conditions.

Biological diversity encompasses the variety and abundance of plants, animals and micro-organisms, ecosystems and ecological processes to which they belong. Nepal is characterized by considerable geographic and biological diversity including the world's highest mountain system, large area of low-lying tropical forest and parts of two of the world's eight biogeographical realms. These characteristics account for the high level of species diversity in such a relatively small area. But now a days it is under threat due to the occurrence of biotic pressures upon them including the high population growth and high percentage of poverty (Joshi *et al.*, 1996). The conservation of biodiversity in the milieu of socio economic development of the people needs an extensive study of the biodiversity.

The rich biodiversity of Nepal was studied on the basis of three physiographic zones. Terai and Siwaliks, Mid hills and Highlands.

The middle hill physiographic zone of Nepal is commonly known as the mid hills. It occupies the central band of the country bounded by the Siwalik range to the south, the high mountains to the north and the Indian border on the east and western sides. The mid hills are defined as lying within the altitudes of 1,000 and 3,000m although at some points higher altitudes are included. The mid hills cover about 30% of the country's area. In the southern part of the mid hills lies the Mahabharat hill range. The Mahabharat have a predominantly east-west configuration of its valleys (Jackson, 1994). Some classification recognize this range as a separate physiographic zone but although it does have some distinctive characteristics it has been grouped within the mid hills as sharing many common features.

Excluding the Mahabharat the “true” midhills are intersected by both north-south and east-west, valleys draining this area and the high mountains to the north. Most of the terrain is steep with two large level plains representing the former lakes-Kathmandu and Pokhara valleys. The midhills rise gradually to the north with no clear cut boundary separating the physiographic zone lying to the north, the foothills of the main Himalayan range (high mountains).

The natural vegetation of the midhills is mostly forest ranging from *Pinus roxburghii* and Oak in the west to *Schima castanopsis* in the east. The area between 1,000m and 2,000m is the most intensively cultivated and settled area and many of the forests in the belt have been cleared for cultivation and settlement.

Most of the midhills cultivated land is in the form of terraced fields, often on steep slopes. The farming system includes summer rice and winter wheat on irrigated land and summer maize and winter wheat on the rainfed cropland. Livestock husbandry is also very important with animals grazed in the forests and fed on tree fodder and “floor” grasses. Crop cultivation, livestock grazing and the forests are the main inter-linked components of the midhills’ villagers’ subsistence. The LRMP found a correlation between the amount of land under forest and the amount of cultivated land (Kenting, 1986). As the area under forest declines so does the area under cultivation as the forests are the major source of fertility for crop cultivation with the leaves from trees making up a major component of livestock feed and bedding which leads to manure and fertilizer production for the fields. The forests are also important in providing the major and often only source for fuel for most people of the midhills.

The vast majority of the population of the midhills relies on subsistence agriculture. The midhills are densely populated for the marginal conditions that they mostly offer with the extreme relief making human settlement and activity very difficult. The water is often in short supply: the slopes are steep and leaves of erosion are often high. In addition, farmer suffer serious crop and livestock depredations from wild animals. The livelihood of many families in the hills is supplemented by remittances from family members working away from their local area, chiefly in India, and in Kathmandu (temporary migrants). Many people from the midhills have

moved and aspire to move to the easier living and richer productivity of the Terai-permanent migrants (Dahal *et al.*, 1977). With improved communications and especially road building continuing a pace much of the remote midhills is being opened up both to outside influences and improving the ease with which local people can move seasonally to find work to the south or even simply for outlying villagers to come into the district center to attend to business. The roads increase access to markets and are leading to over exploitation of the natural resource base. Most livestock farming in Nepal is largely unaffected by advances in agricultural science. Uncontrolled grazing, lopping and grass- collecting is the common practice. Over many areas of the midhills there is a shortage of fodder for livestock. Livestock encroachment is a serious problem not only in national forests but also inside the protected areas. The uncontrolled grazing and collection of fodder from the forests throughout the year has a serious negative impact on biodiversity. Livestock husbandry is a major component of the midhills' farming system with more than half of Nepal's total livestock found in the midhills.

1.2 Present Status of Forest Birds in Nepal

Nepal is renowned internationally for its high diversity of birds species. The high total of 862 species of birds roughly over 8% of the world's known birds has been recorded. The alarming number of 133 birds species (15%) of Nepal's birds is considered threatened. As many as 72 species are thought to be critically threatened or endangered meaning there is an extremely high or very high risk of their becoming extirpated in Nepal in the near future.

Only around 22% of Nepal's land area remains closed canopy forest, whilst 10% of the land is shrub vegetation (FRISP, 1999). However, forests are very diverse, comprising tropical, subtropical, temperate, subalpine and alpine types. Forest and scrubland hold the high proportion of 77% of the country's breeding birds. These habitats are especially important for Nepal's restricted range species. Nearly a quarter (seven species) of Nepal's globally threatened birds utilise forests. Around half of the country's near threatened birds (11 species) utilize forest (Baral *et al.*, 2005).

Habitat loss and damage is the major threat to 89% (119 species) of the birds at risk. The largest number of threatened species depends on forest. A total of 78 species (59% of the total threatened) depends on forests. The remaining threatened species inhabit wet lands (44), grasslands (17), Scrub (3), open country (6), near human habitation (3) and story ground (1). (Baral *et al.*, 2004).

The high proportion of forest birds at risk can be partly attributed to forest comprising the major natural habitat in Nepal and also partly because forest depletion is considered one of the major environmental issues in the country (HMG Nepal, 2001)

The latest assessment of forest status in Nepal in 1994 gave a forest area of 29% and shrub area of 10.6%. Between 1978 and 1994, in terms of area, the forest of Nepal decreased by 24%, while the shrub area increased by 126%. These changes had been mainly due to uncontrolled cutting of trees for fuelwood and forest clearance for agricultural land. Fuelwood comprises 78% of the total fuel consumption due to the lack of alternative fuel. The forest was also encroached by development works and human settlement. In parts of eastern Nepal, the forest area has decreased as a result of the construction of Bhutanese refugee camps in and around forest. Forests are also under great pressure from the ever increasing demand of livestock population for grazing and fodder (HMG Nepal 2001). This over grazing by livestock often prevents tree regeneration. Illegal logging is common and continues to erode Nepal's forest area. Degradation of forest habitat is taking place by selective felling and removal of foliage resulting in forest becoming more open, drier, with a reduced under storey and fewer epiphytes.

The majority of threatened forest birds inhabit the tropical and subtropical and lower temperate zones where forest has been most depleted. Many of the threatened forest birds require dense or moist conditions, a well- developed under storey and epiphytic growth, for example Slaty-bellied Tesia *Tesia olivea*, Broad-billed Warbler *(Tickellia hodgsoni)* and Rufous-throated Wren Babbler *(Spealaeornis caudatus).*

Despite losses and degradation, there is still forest cover on steep slopes and this is likely to continue if access remains too difficult, so providing protection for birds and other wildlife. Forest birds have been less recorded during the last few years because of the current political situation.

One bird species (*Turdoides nipalensis*) is endemic to Nepal. Nine species of birds received protected status under the 1973 NPWC act (Appendix 1). CITES has listed 61 Nepalese bird species in schedules, I, II or III to control their trade. Inskipp (1989b) categorized 103 species of Nepal's forest birds requiring conservation measures. Two hundred and twenty six bird species are included in the National Red data Book on the basis of their global, regional, national and ecological importance as pest controller. Of these 184 (81%) are breeding species, with the remainder migrants. Of the 226 NRDB species, 129 (nine which have already received legal status) have not been recommended for legal protection. The 88 meriting legal protection are the most threatened. Similarly seventeen Nepalese bird species are IUCN threatened.

1.3 Focus of the Study

Phulchowki mountain forest is noted for rich biodiversity and relatively intact habitat within close proximity to Kathmandu city. It is very attractive and an ideal place existed by varieties of flora and fauna. Lying only 40 minutes drive from the busy center of Kathmandu, the forest is well known to visiting birdwatchers but its value is little under stood or appreciated by local people. Phulchowki with proper protection could become a valuable and tranquil retreat for both Nepalese and tourists. (Inskipp and Inskipp, 1989)

Phulchowki forests are internationally famous for the variety of their other wild life too. Martens (1979) states that "Numerous animal species, especially insects and Arachnida hitherto unknown to science have been discovered here in recent years". The forests are also of great value for their flora. Ghimire (1984-1985) advocates their complete protection on the basis of their botanical importance.

Unfortunately, Phulchowki forest is facing severe and increasing threats from various human activities. The subtropical forests are especially threatened by quarries on the lower slopes. Local wood-cutting parties daily remove large quantities of firewood. Enormous quantities of foliage are collected for animal fodder. The road running from the mountain's base to its summit is now surfaced for much of its length and allows vehicles to easily remove timber from the upper as well as lower slopes.

Some researchers have studied on several aspects of this forest. But so far no study has been carried out on the avian diversity of Godawari and Phulchowki recently on the basis of different seasons and their habitat types.

1.4 Objectives

The main objectives of this study are as follows:

1. To explore avian diversity at Godawari during different seasons.
2. To assess the seasonal status of the avifauna in the study area.
3. To assess avian diversity in different habitats of the study area.

1.5 Limitation of the Study

The present study was mainly based on direct observation. Due to limited resources the project work could not accelerate smoothly.

2. STUDY AREA

2.1 Physical Description

The study area lies approximately between 85°22' to 85°24' N latitude and 27°40' to 27°42' E longitude. The study area covers the whole area of Godawari VDC. The site covers the area of 18 square km and is situated approximately 12 km south east from the capital city Kathmandu. Some parts lying east and south of the area are raised but other parts are plain. To the east of the site is Kavreplanchowk district, to the north Godamchaur and Vishankhu Narayan, to the west Jharurarashi and Badikhel and to the south Bhardeu and Lele. The intensive area is confined within the altitude of 1,448 to 2,400m.

The Phulchowki Mountain is the highest peak around the Kathmandu valley attaining 2,715m from the sea level. On its foothill lies the famous Godawari Kund (a small pond) and a small beautiful valley where local people go for pilgrimage once in every twelve years, and has also been servicing as one of the nicest picnic spots for the local gentries from time immemorial. Its beauty and significance is enhanced by the establishment of the Royal Botanical Garden and fisheries in the Godawari valley.

Surrounding hills of Godawari and Phulchowki were once covered with dense forest. Merciless cutting of the trees in the forest to meet the demand of fuel in urban district had left the hills virtually bare except in few protected areas between 2,600m and 2,715m. Few scattered trees have however been saved from destruction by human agency below 2,600m. The most wooded of the hill even now is Phulchowki area where relatively untouched forest with natural vegetation exists to considerable degree. However the devastated hill areas have very recently been protected by law and afforestation programmes that have been carrying on for the last few years in these parts well indicate that after some good years it will once again be converted into a forest.

Fig.2.1. Map Showing the Study Area

2.2 Geological Accounts

Phulchowki belongs to the part of lesser Himalaya and the rocks are mainly shales, sand stone, quartzites and dolomites. The slopes are steep and cross drainage has dissected the area to form many ravines and gullies. Marine fossiliferous rocks of Silurian age have been recorded from Phulchowki hill. The hill is a syncline and contains calcareous rocks in the southern part and also the area near the peak. However, the northern part from middle of the hill slope to the top consists of argillaceous and siliceous rocks and the calcareous rocks are exposed near the northern base of the hill. The calcareous group near peak has lead and traces of zinc have been noted in it. In the middle of the hill ferruginous rocks and large deposits of haematite ores are found. Many tilted blocks of metamorphosed limestone which form the marble deposit of considerable size abounds in near the base of mountain. (Source: HMG, Nepal, 1969)

2.3 Climatic Condition

The area has a typical monsoon climate with rainy summer and dry winter. Over 80% of the total rainfall is encountered during monsoon period starting from early June and ending by late September. Few spells of rain are however, brought down during winter from January to February. Total rainfall recorded was 1552.1 mm in 2004 and 1439 mm in 2005. Maximum rainfall recorded was 577.2mm in July 2004 and 381.5mm in August 2005.

The summer day were quite hot, the maximum temperature recorded was 27.9^{o}C in June 2005 and 26.6^{o} C in May and June 2004. Similarly minimum temperature recorded was 2.9^{o}C in January, 2004 and 3.4^{o} C in January and December, 2005. Mean monthly relative humidity varied from 75.6% to 89.5% at 8:45 A.M. and 65.2 to 90.3% at 17:45 P.M. in 2005.

Godawari valley, the foothills of Phulchowki is more humid and cooler than Kathmandu during summer and winter. Frost occurs during winter and lasts for several weeks in Godawari from early December to February. However Godawari is above the fog belt. Snow fall is very rare in the valley and is confined to higher elevations in Phulchowki area.

Figure 2.2 Annual temperature, annual precipitation and annual relative humidity for 2004 and 2005 recorded at Godawari, Lalitpur (Source: HMG/Nepal, Department of Hydrology and Meteorology)

Fig. 2.2: Annual Temperature of Godawari 2004

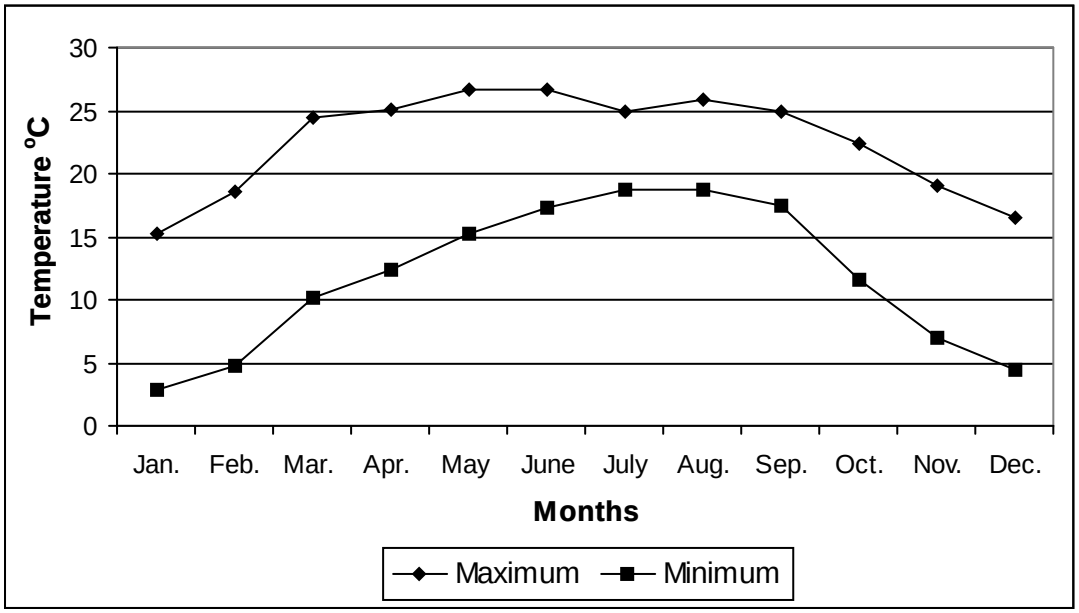


Fig. 2.3: Annual Temperature of Godawari 2005

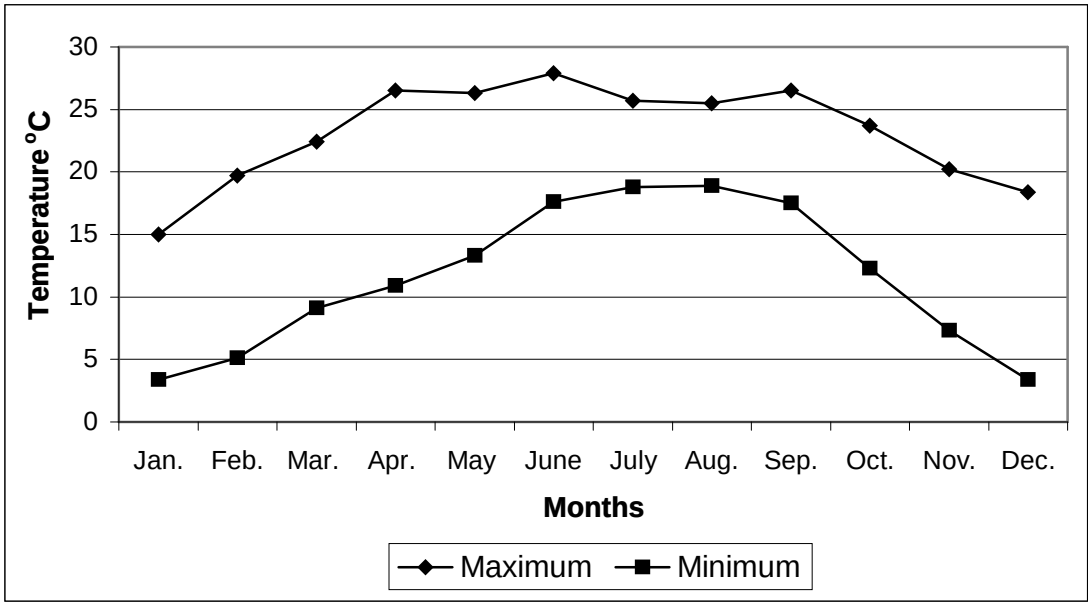


Fig. 2.4: Annual Precipitation of Godawari 2004 and 2005

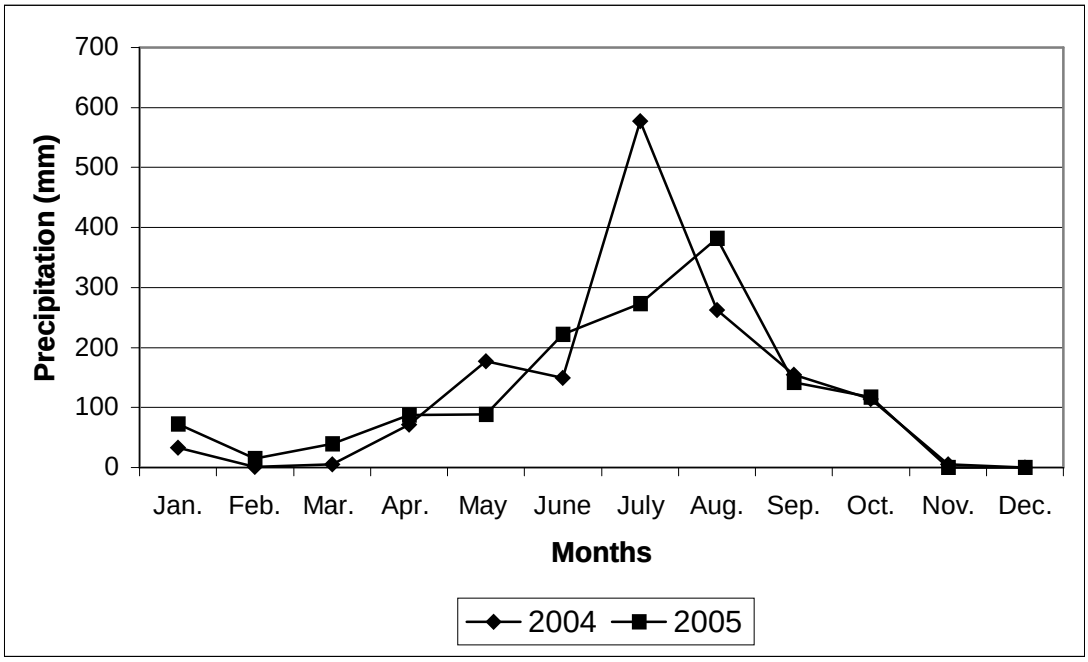


Fig. 2.5: Relative Humidity of Godawari at 8:45 AM, 2004 and 2005

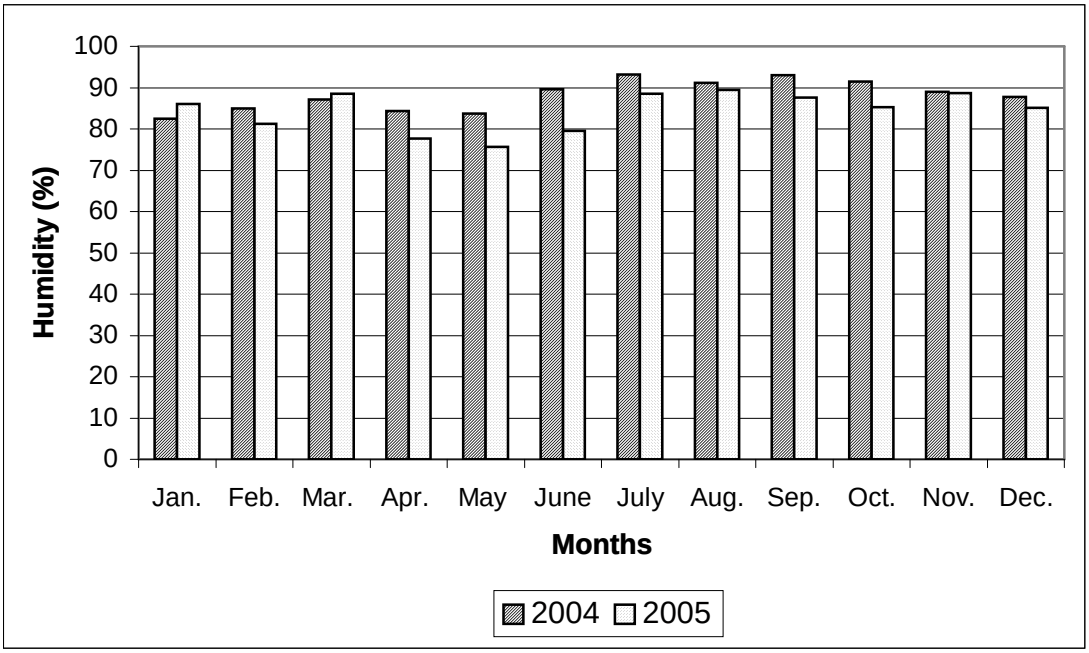
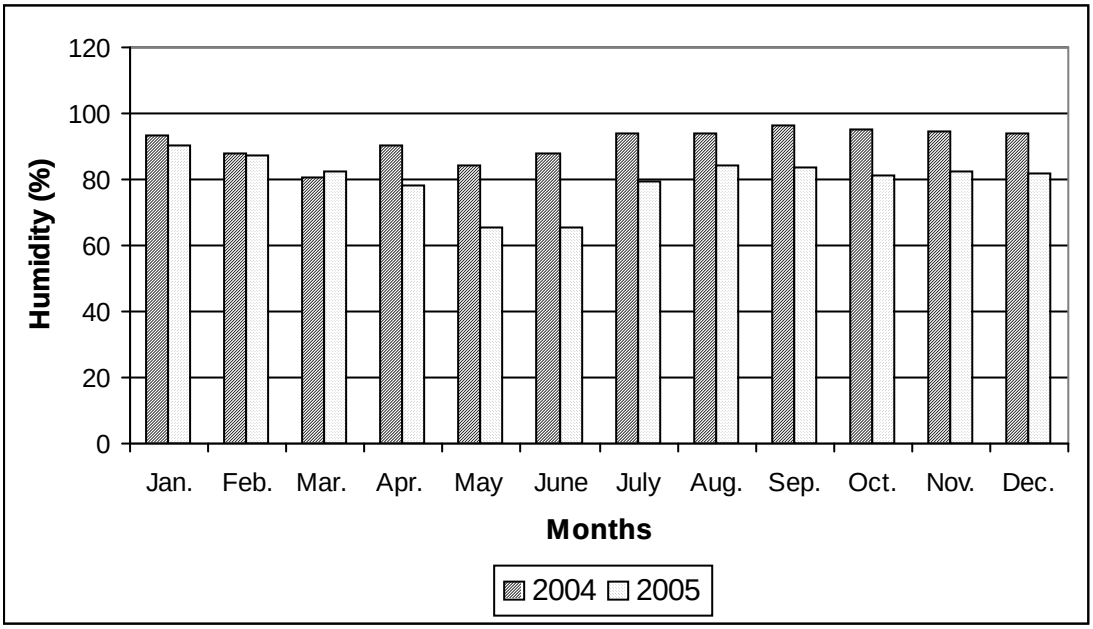


Fig 2.6: Relative Humidity of Godawari at 17:45 2004 and 2005



2.4 Ecological Description

2.4.1 Flora

The principal vegetation of the area consists of mixed forest of broadleaved evergreen in lower altitude from 1,500m to 1,800m and Oak-laurel forest from 1800m to 2400m. The evergreen Oak forest covers the area over 2000m. Coniferous forest is virtually absent. However scattered trees of *Pinus roxburghii* and *Pinus wallichiana* occur here and there. A large portion of the forest below 2000m is destroyed and disturbed by human agency leaving few large trees and slopes facing towards the south is generally converted into terraced field. The basal part of Phulchowki hill and Godawari valley consists of mixed vegetation with a large number of shrubs and small trees. The dominant tree species are *Schima wallichi* and *Castanopsis indica.* Wet ravines and gullies are occupied by *Alnus nepalensis.* There are various other elements in this forest, the prominent ones are *Ilex doniana, Zizyphus incurva, Leucoceptrum canum, Myrica esculenta, Myrsine semiserrata, Rhododendron arboreum, Litsea pulcherrima, Stranvaesia glaucescens* etc.

Exposed places and area are occupied by lopped trees and some shrubs. Shrubs are also abundantly found in forest and shady place. Prominent shrubs of this zone are *Crataegus crenulata, Prinsepia utilis, Daphne papyracea, Mahonia napaulensis, Rubus ellipticus, Rosa brunonii, Ligustrum nepalensis, Phyllanthus parvifolius, Viburnum coriaceum, Eurya acuminata* etc.

The *Schima-Castanopsis* forest is supplemented by *Quercus glauca, Lyonia ovalifolia, Castanopsis tribuloides, Michelia kisopa* and more of the laurel at about 1800m and few hundred meters above it the forest consist of Oaks and laurels with *Rhododendron* and *Lyonia.* Tree canopy is made up of *Quercus glauca, Q. lanata* and *Lithocarpus spicata* with some amount of *Carpinus viminae, Symplocos sps., Sorbus cuspidata, Acer oblongum, Quercus lamellosa.*

The secondary layer of the forest is mainly of *Litsea pulcherrima, Litsea citrata, Pieris formosa, Berberis wallichiana, Mahonia acanthofolia, Rubus sps.* etc.

The Oak-laurel forest is then replaced by the Oak forest of *Quercus semicarpifolia*. It forms pure stand above 2400m. In certain places *Rhododendron* and *Lyonia* are associated with Oak. Shady and moist areas are flourished with laurels while open places are occupied by *Piptanthus nepalensis, Colquhounia coccinea, Barberis* sps. and the bamboos. (HMGN, 1997).

There are quite a few climbers and epiphytes towards the shady slopes of Phulchowki. Some of the common species are *Rubia, Smilax, Cissampelos, Dioscorea, Clematis, Jasminum* etc. Epiphytic vegetation consists of orchids, ferns and some members of Loranthaceae.

The ground vegetation of the area is dominated by *Mariscus sumatrensis, Cynodon dactylon, Imperata cylindrica, Carex nubigena, Carex cruciata, Eragrostris nigra, Poa annua, Kyllinga nemoralis* etc.

The plants grown by the local people in the surrounding area for economic purpose are enumerated as follows.

A. Cereals

1. *Oryza sativa* L. (Paddy)
2. *Triticum aestivum* L. (Wheat)
3. *Zea mays* L. (Maize)
4. *Eleusine corocana* (L.) finger millet

B. Pulses

1. *Pisum sativum* L. (Pea)
2. *Pisum arvense* L. (Pea)
3. *Glycine max* (L.) Merr. (Soyabean)
4. *Dolichos lablab* L. (Lablab)

C. Vegetables

1. *Solanum tuberosum* L. (Potato)
2. *Solanum melongena* L. (Brinjal)
3. *Abelmoschus esculentus* (L.) Moench (Lady's Finger)
4. *Cucurbita maxima*. Duchesne. (Pumpkin)
5. *Lycopersicum esculentum* Mill. (Tomato)
6. *Momordica charantia* L. (Bitter gourd)
7. *Raphanus sativus* L. (Radish)
8. *Vicia faba* L. (Broad bean)
9. *Vigna unguiculata* (L.) Walp. (cowpea)

D. Fruit

1. *Citrus limon* (L.) Burn. f. (Lemon)
2. *Citrus medica* L. (Citron)
3. *Citrus maxima* (Burm.) Herr. (Melon fruit)

4. *Citrus auranticum* L. (Orange)
5. *Cucumis sativus* L. (Cucumber)
6. *Prunus persica* (L.) Solkes. (Peach)
7. *Pyrus communis* L. (Pear)
8. *Prunus domestica* L. (Common plum)

E. Oils

1. *Brassica campestris* Var. toria. Duthie and Fuller. (Mustard)

F. Spices and Condimens

1. *Coriandrum sativum* L. (Coriander)
2. *Curcuma longa*. Roxb. (Turmeric)
3. *Capsicum annum* L. (Capsicum)
4. *Allium cepa* L. (Onion)
5. *Allium sativum* L. (Garlic)
6. *Zingiber officinale* Rosc. (Ginger)

2.4.2 Fauna

The central midhills of Nepal are rich in faunal diversity. Altogether 465 species of butterflies, 69 species of fish, 21 species of amphibians; 35 species of snakes, 11 species of Lizards, 1 species of Turtles, 666 species of birds and 99 species of mammals have been reported from central midhills (BPP, 1995).

Out of 32 midhills confined mammal species, fourteen are confined to the central midhills including Common Dwarf Shrew (*Suncus etruscus*), Woodland Shrew (*Crocidura attentuata),* Mountain Fruit Bat (*Sphaerias blanfordi*), Intermediate Horse-shoe Bat (*Rhinolophus affinis*), Greater Horse-shoe Bat (*Rhinolophus ferrumequinum*), Least Round Leaf Bat (*Hipposideros cineraceus*), Copper-winged Bat (*Myotis formosus*), *Myotis muricola, M. Sicarius* and *Miniopterus pusillus.*

Similarly, Ceylon Cat Snake (*Boiga ceylonensis*), Gunther's Worm Snake (*Trachischium guentheri*), Orange-bellied Worm Snake (*Trachischium tenuiceps*) and Stejneger's Pit Viper (*Trimeresurus stejnegeri*) are central mildhills confined species of snakes (BPP, 1995).

2.5 Socio-Economic Aspects

The majority of the indigenous people living in Godawari VDC includes Brahmin, Gurung, Thakuri, Tamang, Chhetriya, Newar, Magar, Kami and Damai. Population density of the area is 348 per square kilometer where as population density of our country is 157.73 per square kilometer (National Census, 2058).

66% of the total land of the area is occupied by forest where as 33% of the total land is covered by arable land.

Agriculture, animal husbandary and harvesting of forest products are the major activities of the area. Rice, Wheat, Maize, Millet are major crop production where as Potato, Mustard, pulses are grown in low amount. Lemon, Melon-fruit, Orange, Cucumber, Pear are the main fruit products of the area.

Livestock is the major component of the agricultural system of the area. The main livestocks are goat, buffalo, pigs and poultry. Part of day to day expenditures for basis commodities, children's education expenses and other miscellaneous expenses are borne by income generated from the sale of livestock and their products. Women are more active in agriculture as compared to men.

Forest products are used in various ways such as in the form of fodder, household goods, and thatching materials. The illegal trade of timber and poaching of wildlife by the local people are another destructive occupation of the area. However, some people have adopted business, industry, job, study as their occupation.

3. MATERIALS AND METHOD

For the present research work, the methodology was followed as prescribed by Bibby *et al.*, 2000, Pyhala, M. 2001, Sutherland *et al.*, 1996. For further convenience the methodology was splitted as follows.

3.1 Literature Study

The current literature about the status, distribution, conservation and diversity of bird species were briefly surveyed. More information were collected from T.U. central Library, Bird Conservation Nepal (BCN), Department of National Park and Wild Life Conservation (DNPWC), The World Conservation Union (IUCN), International Center for Integrated Mountan Development (ICIMOD) etc.

3.2 Field Survey and Data Collection

First of all, a preliminary survey was carried out during the first and second weeks of June 2004 in order to collect information regarding vegetation, birds and other natural resources of the study area. During this period, a general view of different vegetations was also made by field visits and they were identified with the help of literatures. For thorough exploration of the study area regular discussions and consultations with rangers, guards and local peoples were carried out. As per requirement of the study the bird habitats were categorized largely based on the vegetation structures.

i **Broad Leaved Subtropical Forest (BLSF):** This forest is represented by mixed forest of broadleaved evergreen in lower altitude from 1,500m to 1,800m. The dominant tree species are *Schima wallichi* and *Castanopsis indica*. The basal part of this area consists of a large number of shrubs and small trees.

ii **Wooded Grassland (WGL):** These were represented by patches of bushes, trees with ground vegetation including wooded area in the vicinity of village and agricultural areas.

iii **Human Habitation Edge (HHE):** These were represented by the village areas including orchards, gardens around it.

iv **Agricultural Land (AGRL):** These were confined to the vicinity of villages. People largely cultivate paddy, maize wheat, mustard, legumes in these areas.

v **Wetland (WL):** Permanent wetland was very low in the area. These were represented by hill streams and some boggy places in the study area.

vi **Moist Broadleaved Lower Temperate Forest (MBLTF):** This forest comprises the species of Oaks (Quercus) with laurels (Lauraceae) in altitude from 1,800m to 2,400m. The forest consists of oaks and Laurels with Rhododendron and Lyonia. Tree canopy is made up of *Quercus glauca, Q. lanata, Lithacarpus spicata* etc. and the secondary layer is mainly of *Litsea pulcherrima, Litsea citrata, Piersis formosa* etc.

After identification of the habitat types, 6 transect routes of variable length (1,770-3,300m) were divided into 6 randomly located parts. To avoid bias, an attempt was made to escape the linear features like a path, a hedge or a stream which may have on bird population (Sutherland *et al.*, 1996) however one transect route was along the road. No distance were recorded, all birds were counted on either side of the routes so that different species could be counted on different scales because of differing detectabilities (Bibby *et al.*, 2000). In each season the distance of about 30,100m was walked along the transect routes. Each transect route was visited twice in each season. Altogether 48 visits were made along the transect routes. Each bird observation was noted along with habitat type(s) whether the birds were seen in relation to broadleaved subtropical forest, wooded grassland, human habitation edge, agricultural land, wet land and moist broadleaved lower temperate forest.

Birds were observed in the study area from June 2004 to April 2005. During this period total four surveys were taken seasonally. First survey was conducted from 25th June to 10th July 2004. Second survery was conducted from 20th September to 3rd October 2004. Third survey was conducted from 5th January to 16th January 2005. Similarly fourth survey was conducted from 12th April to 25th April 2005. In each survey single data was recorded from each transect route. The data recorded from each survey was used to calculate their respective seasonal diversity.

The observed birds were identified following shrestha, T.K. (2000) “Birds of Nepal” and Grimmet *et al.,* (2000), “Birds of Nepal”. The birds list also followed the systematic order as “Birds of Nepal” (Shrestha, T.K., 2000).

On the basis of their occurrence in different seasons each bird was given a status. To assign the status, Pyhala, M. 2001. “Bird of Islamabad” Status and Seasonality, was followed. The book stated as Resident–present throughout the year, Summer visitor–seen from about April to September only, Winter visitor–seen from August to April-May. Passage migrant–seen on migration (Spring, autumn or double).

All the birds recorded was listed to make a checklist of bird species of Godawari and its adjacent regions.

Species diversity of birds was calculated by using Shannon-Wiener function. (Shannon and Wiener, 1948, cited in Zar, 1984., Shah, 2000., Basnet, 2001.) The function is

$$H = \frac{n \log n - \sum fi \log fi}{n}$$

where, H = index of species diversity

n = total individuals

fi = number of individual species

For the relative diversity of species Jacob's coefficient was used.

$$J = \frac{H}{H_{max}} \qquad (\therefore H_{max} = \log K)$$

Where

J = relative diversity

H = observed diversity

H_{max} = proportion of maximum possible diversity

K = number of species present

Plate 1: The subtropical forest threatened by quarries in the study area

Plate 2: Agricultural land of Godawari

Plate 3: Godawari hill stream

Plate 4: South west part of the study area and its adjacent village

Plate 5: Eastern part of Godawari

Plate 6: Bamboo groves near wooded grassland of the study area.

4. RESULTS

4.1 Avian Diversity at Godawari During Different Seasons

161 spcecies beloning to 11 orders 36 families were observed in the study area (Table 4.6, Fig 4.3 and Appendix I). The highest number of species 127 (78.88%) was represented by the order Passeriformes along with 25 families. Other major orders were Piciformes 10 species (6.21%), Accipitriformes 7 species (4.34%), Cuculiformes 6 species (3.72%) and Columbiformes 3 species (1.86%). Strigiformes and Galliformes represented 2 species (1.24%) each. Apodiformes, Upupiformes, Coraciiformes and Ciconiiformes represented 1 species (0.62%) each.

Among the four seasons, the species-richness was found to be highest in winter season 127 species (78.88%), followed by summer season, 116 species (72.04%), spring season 107 species (66.45%) and autumn season 100 species (62.11%) Similarly species diversity index was found to be highest in winter (1.9355) followed by summer (1.9017), spring (1.8821) and autumn (1.8219). Relative diversity was found to be highest in spring (0.9274), followed by winter (0.9200), autumn (0.9109) and summer (0.9100). Out of 161 species, 109 species (67.7%) were resident, 30 species (18.63%) were winter visitor, 19 species (11.8%) were summer visitor and 3 species (1.86%) were passage migrants (Fig. 4.4).

4.1.1 Bird Diversity During Summer Season

Altogether 116 species of birds (72.04%) were observed during summer season (Table 4.1). Species diversity index of summer season was 1.90176 and relative diversity was found to be 0.9100. During this season total number of individuals was found to be 865. Highest number of individuals was of *Passer domesticus* (66 individuals) and the lowest number of individuals (1) was represented by *Garrulax lineatus, Otus spilocephalus, Dendrocopos cathpharius* and *Blythipicus pyrrhotis* each.

Table 4.1: Bird Diversity During Summer 2004.

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
1.	Dark-sided Fly catcher	*Muscicapa sibirica*	MBLTF	4
2.	Snowy-browed Flycatcher	*Ficedula hyperythra*	MBLTF	2
3.	Ultramarine Flycatcher	*Ficedula superciliaris*	MBLTF	2
4.	Verditer Flycatcher	*Muscicapa thalassina*	WGL, BLSF	8
5.	Orange-headed Thrush	*Zoothera citrina*	MBLTF	3
6.	Pied Thrush	*Zoothera wardii*	BLSF, WL	2
7.	Tickell's Thrush	*Turdus unicolor*	MBLTF	2
8.	Scaly Thrush	*Zoothera dauma*	MBLTF, WL	4
9.	Red-rumped Swallow	*Hirundo daurica*	AGRL, WL, HHE, WGL,	24
10.	Large Hawk Cuckoo	*Hierococcyx sparverioides*	MBLTF	3
11.	Indian Cukoo	*Cuculus micropterus*	WGL, BLSF	4
12.	Eurasian Cuckoo	*Cuculus canorus*	WGL, BLSF	4
13.	Oriental Cuckoo	*Cuculus saturatus*	WGL	2
14.	Drongo Cukoo	*Surniculus lugubris*	WGL, AGRL	4
15.	Asian Koel	*Eudynamys scolopacea*	WGL, AGRL	2
16.	Crested Serpent Eagle	*Spilornis cheela*	BLSF	3
17.	White-throated Laughingthrush	*Garrulax albogularis*	BLSF, MBLTF	4
18.	Whitre-crested Laughingthrush	*Garrulax leucolophus*	BLSF, WGL	5
19.	Chestnut-crowned Laughingthrush	*Garrulax erythrocephalus*	MBLTF	7
20.	Whiskered Yuhina	*Yuhina flavicollis*	MBLTF, BLSF	14
21.	Stripe-throated Yuhina	*Yuhina gularis*	MBLTF	4
22.	Rufous Sibia	*Heterophasia capistrata*	BLSF, MBLTF	7
23.	White-browed Fulvetta	*Alcippe vinipectus*	BLSF, MBLTF	4
24.	Chestnut-headed Tesia	*Tesia castaneocoronata*	BLSF	5
25.	Blyth's Leaf Warbler	*Phylloscopus reguloides*	MBLTF	4
26.	Buff-barred Warbler	*Phylloscopus pulcher*	MBLTF	6

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
27.	Grey-hooded Warbler	*Seicercus xanthoschistos*	MBLTF, BLSF	14
28.	Oriental Magpie Robin	*Copsychus saularis*	HHE, BLSF, WGL	10
29.	Black-throated Tit	*Aegithalos concinnus*	BLSF, MBLTF	14
30.	Chestnut-bellied Nuthatch	*Sitta castanea*	BLSF	7
31.	White-tailed Nuthatch	*Sitta himalayensis*	MBLTF	4
32.	Paddyfield Pipit	*Anthus rufulus*	AGRL	6
33.	Green-tailed Sunbird	*Aethopyga nipalensis*	MBLTF	4
34.	House Sparrow	*Passer domesticus*	HHE, AGRL, WGL	66
35.	Eurasian Tree Sparrow	*Passer montanus*	AGRL, WGL	36
36.	Barn Swallow	*Hirundo rustica*	AGRL, HHE, WL	44
37.	Black Drongo	*Dicrurus macrocercus*	AGRL, WGL, HHE	10
38.	Common Myna	*Acridotheres tristis*	HHE, AGRL, BLSF, WGL	38
39.	Jungle Myna	*Acridotheres fuscus*	BLSF, WGL, HHE	12
40.	House Crow	*Corvus splendens*	HHE, AGRL, BLSF	26
41.	Eurasian Jay	*Garrulus glandarius*	BLSF, MBLTF	6
42.	Long-tailed Minivet	*Pericrocotus ethologus*	BLSF, MBLTF	8
43.	Himalayan Bulbul	*Pycnonotus leucogenys*	MBLTF, BLSF	6
44.	Red-vented Bulbul	*Pycnonotus cafer*	AGRL, BLSF, WGL MBLTF	22
45.	Black Bulbul	*Hypsipetes leucocephalus*	BLSF, MBLTF	12
46.	Rock Pigeon	*Columba livia*	HHE, AGRL	30
47.	Spotted Dove	*Streptopelia chinensis*	BLSF, HHE, AGRL, WGL	8
48.	Oriental Turtle Dove	*Streptopelia orientalis*	BLSF, WL, AGRL, WGL	7

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
49.	Cattle Egret	*Bubulcus ibis*	WGL, WL	13
50.	Black-Chinned Babbler	*Stachyris pyrrhops*	BLSF, WGL, MBLTF	4
51.	Rusty-Cheeked Scimitar Babbler	*Potamorhinus erythrogenys*	BLSF, MBLTF	5
52.	Striated Laughingthrush	*Garrulax striatus*	BLSF	2
53.	Chestnut-tailed Minla	*Minla strigula*	MBLTF	2
54.	White-bellied Yuhina	*Yuhina zantholeuca*	BLSF, WL	6
55.	Rufous-winged Fulvetta	*Alcippe castaneceps*	MBLTF	12
56.	Nepal Fulvetta	*Alcippe nipalensis*	BLSF, MBLTF	6
57.	Grey-headed Canary Flycather	*Culicicapa ceylonensis*	BLSF, WGL	5
58.	White-throated Fantail	*Rhipidura albicollis*	BLSF	2
59.	Gray Bushchat	*Saxicola ferrea*	MBLTF, BLSF	6
60.	Green-backed Tit	*Parus monticolus*	MBLTF, BLSF	7
61.	Black-lored Tit	*Parus xanthogenys*	BLSF, WGL	4
62.	Brown-throated Treecreeper	*Certhia discolor*	MBLTF	3
63.	Fire-breasted Flowerpecker	*Dicaeum ignipectus*	MBLTF, BLSF	6
64.	Oriental White-eye	*Zosterops palpebrosus*	BLSF, MBLTF	6
65.	Long-tailed Shrike	*Lanius schach*	WGL, HHE, AGRL	6
66.	Ashy Drongo	*Dicrurus leucophaeus*	BLSF, MBLTF	3
67.	Jungle Crow	*Corvus macrorhynchos*	MBLTF HHE	4
68.	Red-billed Blue Magpie	*Urocissa erythrorhyncha*	MBLTF, BLSF	6
69.	Grey Trepie	*Dendrocitta formosae*	BLSF, WGL	9
70.	Scarlet Minivet	*Pericrocotus flammeus*	MBLTF	8
71.	Mountain Bulbul	*Hypsipetes mcclellandii*	MBLTF, BLSF	6
72.	House Swift	*Apus affinis*	HHE, WGL	18
73.	Great Barbet	*Megalaima virens*	HHE, MBLTF, BLSF	7
74.	Grey-headed Woodpecker	*Picus canus*	MBLTF, BLSF	6
75.	Fulvous-breasted	*Dendrocopos macei*	BLSF, MBLTF	6

S.N.	Common Name	Scientific Name	Habitat	Pop^{n}
	Woodpecker			
76.	Kalij Pheasant	*Lophura leucomelanos*	MBLTF, BLSF	5
77.	Spiny Babbler	*Turdoides nipalensis*	BLSF, MBLTF	3
78.	Black-throated Babbler	*Stachyris nigriceps*	MBLTF	6
79.	Streak-breasted Scimitar Babbler	*Pomatorhinus ruficollis*	BLSF, MBLTF	6
80.	Green Shrike Babbler	*Pteruthius xanthochlorus*	MBLTF	2
81.	Black-eared Shrike Babbler	*Pteruthius melanotis*	MBLTF	6
82.	White-browed Shrike Babbler	*Pteruthius flaviscapis*	MBLTF	8
83.	Rufous-chinned Laughingthrush	*Garrulax rufogularis*	BLSF, MBLTF	5
84.	Gray-sided Laughingthrush	*Garrulax caerulatus*	BLSF, MBLTF	7
85.	Streaked Laughingthrush	*Garrulax lineatus*	MBLTF	1
86.	Red-billed Leiothrix	*Leiothrix lutea*	MBLTF	4
87.	Hoary-throated Barwing	*Actinodura nipalensis*	MBLTF	7
88.	Blue-winged Minla	*Minla cyanouroptera*	MBLTF	6
89.	Large Niltava	*Niltava grandis*	MBLTF	2
90.	Small Niltava	*Niltava macgrigoriae*	BLSF, WGL	3
91.	Rufous-bellied Niltava	*Niltava sundara*	MBLTF	8
92.	Pigmy Blue Flycatcher	*Muscicapella hodgsoni*	MBLTF	2
93.	Grey-bellied Tesia	*Tesia cyaniventer*	BLSF, WL	6
94.	Common Tailorbird	*Orthotomus sutorius*	BLSF, WGL, HHE	5
95.	Chestnut-crowned Warbler	*Seicercus castaniceps*	MBLTF	6
96.	Black-faced Warbler	*Abroscopus schisticeps*	MBLTF	8
97.	Spotted Forktail	*Enicurus maculatus*	WL	7
98.	Pied Bushchat	*Saxicola caprata*	HHE, WGL, AGR	4
99.	Blue Whistling Thrush	*Myophonus caeruleus*	BLSF, WL	2
100.	Grey-winged Blackbird	*Turdus boulboul*	MBLTF	3
101.	Great Tit	*Parus major*	BLSF, WGL	6

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
102.	Velvet-fronted Nuthatch	*Sitta frontalis*	WGLM BLSF	6
103.	Plain Flowerpecker	*Dicaeum concolor*	BLSF, WGL	5
104.	Scaly-breasted Munia	*Lonchura punctulata*	WGL, BLSF, AGRL	10
105.	Maroon Oriole	*Oriolus traillii*	MBLTF, BLSF	2
106.	Bronzed Drongo	*Dicrurus aeneus*	BLSF	3
107.	Mountain Scops Owl	*Otus spilocephalus*	MBLTF	1
108.	White-throated Kingfisher	*Halcyon smyrnensis*	WL	2
109.	Golden-throated Barbet	*Megalaima franklinii*	MBLTF	2
110.	Speckled Piculet	*Picumnus innominatus*	BLSF, WGL	3
111.	Darjeeling Woodpecker	*Dendrocopos darjellensis*	MBLTF	4
112.	Crimson-breasted Woodpecker	*Dendrocopos cathpharius*	MBLTF	1
113.	Greater yellownape	*Picus flavinucha*	BLSF, WGL,	2
114.	Bay Woodpeaker	*Blythipicus pyrrhotis*	BLSF	1
115.	Hill Partridge	*Arborophila torqueola*	MBLTF	2
116.	Besra	*Accipiter virgatus*	BLSF	2
				865

4.1.2 Bird Diversity During Autumn Season

Altogether 100 species of birds (62.11%) were observed during autumn season (Table 4.2). Species diversity index of autumn season was 1.82199 and the relative diversity was 0.9109. During this season total number of individuals was found to be 707. The highest number of individuals was represented by *Passer domesticus* (50 individuals) and the lowest number of individuals (1) was represented by *Otus spilocephalus, Glaucidium brodiei, Upupa epops, Halcyon smyrnensis*, *Blythipicus pyrrhotis* and *Pernis ptilorhyncus* each

Table 4.2: Bird Diversity During Autumn 2004

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
1.	Common Kestrel	*Falco tinnunculus*	AGRL	2
2.	Black Kite	*Milvus migrans*	HHE, BLSF, MBLTF	4
3.	Grey Wagtail	*Motacilla cinerea*	WL	3
4.	White-throated Laughingthrush	*Garrulax albogularis*	BLSF, MBLTF	7
5.	White-crested Laughingthrush	*Garrulax leucolophus*	BLSF, WGL	8
6.	Chestnut-crowned Laughingthrush	*Garrulax erythrocephalus*	MBLTF, WL	6
7.	Whiskered Yuhina	*Yuhina flavicollis*	MBLTF, BLSF	16
8.	Stripe-throated Yuhina	*Yuhina gularis*	MBLTF	6
9.	Rufous Sibia	*Heterophasia capistrata*	MBLTF, BLSF	9
10.	White-browed Fulvetta	*Alcippe vinipectus*	MBLTF, BLSF	9
11.	Chestnut-headed Tesia	*Tesia castaneocoronata*	BLSF	6
12.	Grey-hooded Warbler	*Seicercus xanthoshistos*	BLSF, MBLTF	8
13.	Oriental Magpie Robin	*Copsychus saularis*	HHE, BLSF, WGL	12
14.	Black-throated Tit	*Aegithalos concinnus*	BLSF, MBLTF	9
15.	Chestnut-bellied Nutatch	*Sitta castanea*	BLSF	4
16.	White-tailed Nuthatch	*Sitta himalayensis*	MBLTF	7
17.	Paddyfield Pipit	*Anthus rufulus*	AGRL	6
18.	Green-tailed Sunbird	*Aethopyga nipalensis*	MBLTF	4
19.	House Sparrow	*Passer domesticus*	HH., AGRL, WGL	50
20.	Eurasian Tree Sparrow	*Passer montanus*	AGRL, WGL	18
21.	Barn Swallow	*Hirundo rustica*	AGRL, HHE, WL	22

S.N.	Common Name	Scientific Name	Habitat	Pop^{n}
22.	Black Drongo	*Dicrurus macrocercus*	AGRL, HHE, WGL	4
23.	Common Myna	*Acridotheres tristis*	HHE, AGRL, BLSF, WGL	42
24.	Jungle Myna	*Acridotheres fuscus*	BLSF, HHE, AGRL WGL	18
25.	House Crow	*Corvus splendens*	HHE, AGRL	28
26.	Eurasian Jay	*Garrulus glandarius*	BLSF, MBLTF	8
27.	Long-tailed Minivet	*Pericrocotus ethologus*	BLSF, MBLTF	14
28.	Himalayan Bulbul	*Pycnonotus leucogenys*	BLSF, WGL	6
29.	Red-vented Bulbul	*Pycononotus cafer*	AGRL, BLSF, WGL	16
30.	Black Bulbul	*Hypsipetes leucocephalus*	BLSF, MBLTF	14
31.	Rock Pigeon	*Columba livia*	HHE, AGRL	36
32.	Spotted Dove	*Streptopelia chinensis*	WGL, HHE, AGRL	10
33.	Oriental Turtle Dove	*Streptopelia orientalis*	BLSF, AGRL, WGL	5
34.	Cattle Egret	*Bubulcus ibis*	WGL, WL	12
35.	Black-chinned Babbler	*Stachyris pyrrhops*	WGL, BLSF	2
36.	Rusty-cheeked Scimitar Babbler	*Pomatorhinus erythrogenys*	BLSF, MBLTF	3
37.	Striated-Laughingthrush	*Garrulax striatus*	BLSF	2
38.	Chestnut-tailed Minla	*Minla strigula*	MBLTF, BLSF	5
39.	White-bellied Yuhina	*Yuhina zantholeuca*	BLSF, WL	4
40.	Rufous-winged Fulvetta	*Alcippe castaneceps*	MBLTF	14
41.	Nepal Fulvetta	*Alcippe nipalensis*	BLSF, MBLTF	8
42.	Grey headed Canary Flycatcher	*Culicicapa ceylonensis*	BLSF, WGL	6

S.N.	Common Name	Scientific Name	Habitat	Pop^{n}
43.	White-throated Fantail	*Rhipidura albicollis*	BLSF	3
44.	Gray Bushchat	*Saxicola ferrea*	BLSF, MBLTF	6
45.	Green-backed Tit	*Parus monticolus*	BLSF, MBLTF	5
46.	Black-lored Tit	*Parus xanthogenys*	BLSF, WGL	8
47.	Brown-throated Treecreeper	*Certhia discolor*	MBLTF	3
48.	Fire-breasted Flowerpecker	*Dicaeum ignipectus*	BLSF	4
49.	Oriental White-eye	*Zosterops palpebrosus*	BLSF, WGL	7
50.	Long-tailed Shrike	*Lanius schach*	WGL, HHE, AGRL	3
51.	Ashy Drongo	*Dicrurus leucophaeus*	BLSF, MBLTF	2
52.	Jungle Crow	*Corvus macrorhynchos*	AGRL, HHE	2
53.	Red-billed Blue Magpie	*Urocissa erythrorhyncha*	MBLTF, BLSF	8
54.	Grey Treepie	*Denrocitta formasae*	BLSF, HHE	6
55.	Scarlet Minivet	*Pericrocotus flammeus*	MBLTF	5
56.	Mountai Bulbul	*Hypsipetes mcclellandii*	BLSF	3
57.	House Swift	*Apus affinis*	HHE, WGL	14
58.	Great Barbet	*Megalaima virens*	MBLTF, BLSF	8
59.	Grey-headed Woodpecker	*Picus canus*	MBLTF, BLSF	5
60.	Fulvous-breasted Woodpecker	*Dendrocopos macei*	BLSF	2
61.	Kalij Pheasant	*Lophura leucomelanos*	BLSF, MBLTF	5
62.	Spiny Babbler	*Turdoides nipalensis*	BLSF, MBLTF	4
63.	Grey-throated Babbler	*Stachyris nigriceps*	BLSF	7
64.	Streak-breasted Scimitar Babbler	*Pomatorhinus ruficollis*	BLSF, MBLTF	3
65.	Black-eared Shrike Babbler	*Pteruthius melanotis*	BLSF, MBLTF	4
66.	White-browed Shrike Babbler	*Pteruthius flaviscapis*	MBLTF, BLSF	6

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
67.	Rufous-chinned Laughingthrush	*Garrulax rufogularis*	BLSF	4
68.	Gray-sided Laughingthrush	*Garrulax caerulatus*	BLSF	2
69.	Streaked Laughingthrush	*Garrulax lineatus*	BLSF, WGL	2
70.	Small Niltava	*Niltava macgrigoriae*	BLSF	3
71.	Rufous-bellied Niltava	*Niltava sundara*	MBLTF	4
72.	Grey-bellied Tesia	*Tesia cyaniventer*	BLSF	2
73.	Common Tailorbird	*Orthotomus sutorius*	BLSF, WGL	9
74.	Chestnut-crowned Warbler	*Seicercus castani ceps*	MBLTF	5
75.	Black-faced Warbler	*Abroscopus schisticeps*	BLSF, MBLTF	12
76.	Spotted Forktail	*Enicurus maculatus*	WL	4
77.	Pied Bushchat	*Saxicola caprata*	WGL, AGRL	3
78.	Blue Whistling Thrush	*Myophonus caeruleus*	BLSF, WL	4
79.	Grey-winged Blackbird	*Turdus boulboul*	MBLTF	2
80.	Great Tit	*Sylviparus major*	BLSF, WGL	4
81.	Yellow-browed Tit	*Sylviparus modestus*	MBLTF	2
82.	Velvet-fronted Nathatch	*Sitta frontalis*	WGL, BLSF	9
83.	Black-breasted Sunbird	*Aethopyga saturata*	BLSF	2
84.	Brown Bullfinch	*Pyrrhula nipalensis*	MBLTF	6
85.	Large Cuckooshrike	*Coracina macei*	WGL, AGRL	2
86.	Mountain Scops Owl	*Otus spilocephalus*	MBLTF	1
87.	Collared Owlet	*Glaucidium brodiei*	MBLTF	1
88.	Common Hoopoe	*Upupa epops*	AGR	1
89.	White-throated Kingfisher	*Halcyon smyrnensis*	WL	1
90.	Blue-throated Barbet	*Megalaima asiatica*	WGL, HHE	3
91.	Speckled Piculet	*Picumnus innominatus*	BLSF, WGL	2
92.	Darjeeling Woodpecker	*Dendrocopos darjellensis*	MBLTF	3
93.	Crimson-breasted Woodpecker	*Dendrocopos*	BLSF, MBLTF	4

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
		cathpharius		
94.	Greater Yellownape	*Picus flavinucha*	BLSF, WGL	3
95.	Bay Woodpecker	*Blythipicus pyrrhotis*	BLSF	1
96.	Hill Partridge	*Arborophila torqueola*	MBLTF	2
97.	Black Eagle	*Ictinaetus malayensis*	BLSF, MBLTF	3
98.	Mountain Hawk Eagle	*Spizaetus nipalensis*	WGL, MBLTF	2
99.	Besra	*Accipiter virgatus*	WGL, AGRL	2
100.	Oriental Honey Bazzard	*Pernis ptilorhyncus*	BLSF	1
				707

4.1.3 Bird Diversity During Winter Season

Altogether 127 species of birds (78.88%) were observed during winter season (Table 4.3). Species diversity index of winter season was 1.9355 and the relative diversity was 0.9200. During this season total number of individual was found to be 846. The highest number of individuals was represented by *Acridotheres tristis* (44 individuals) and the lowest (1 individual) was represented by *Dicrurus leucophaeus, Megalaima virens, Turdoides, nipalensis, Pteruthius xanthochlorus, Oriolus traillii, Garrulus lanceolatus, Megalaima asiatica, Accipiter virgatus, Pernis ptilorhyncus* each.

Table 4.3: Bird Diveristy During Winter 2005

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
1.	Rufous-gorgeted Flycatcher	*Ficedula strophiata*	MBLTF	3
2.	Red-throated Flycatcher	*Ficedula parva*	WGL, BLSF	4
3.	Yellow-bellied Fantail	*Rhipidura hypoxantha*	BLSF	2
4.	Aberrant Bush Warbler	*Cettia flavolivacea*	WGL, BLSF	4
5.	Grey-sided Bush Warbler	*Cettia brunnifrons*	BLSF	4
6.	Ashy-throated warbler	*Phylloscopus maculipennis*	BLSF, WL	14

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
7.	Yellow-browed Warbler	*Phylloscopus inornatus*	BLSF, WGL	12
8.	Golden-spectacled Warbler	*Seicercus burkii*	BLSF	8
9.	Golden Bush Robin	*Tarsiger chrysaeus*	BLSF	4
10.	Orange-flanked Bush Robin	*Tarsiger cyanurus*	BLSF, WGL	6
11.	Blue-fronted Redstart	*Phoenicurus frontalis*	WGL	2
12.	Hodgson's Redstart	*Phoenicurus hodgsoni*	WGL, AGRL	6
13.	White-capped Water Redstart	*Chaimarrornis leucocephalus*	WL	5
14.	Plumbeous Water Redstart	*Rhyacornis fulginosus*	WL	4
15.	Stonechat	*Saxicola torquata*	AGRL	4
16.	Dark-throated Thrush	*Turdus ruficollis*	WGL, AGRL, BLSF	7
17.	Rufous-breasted Accentor	*Prunella strophiata*	MBLTF	2
18.	Olive-backed Pipit	*Anthus hodgsoni*	BLSF, MBLTF	11
19.	Yellow-bellied Flowerpecker	*Dicaeum melanoxanthum*	WGL	3
20.	Fire-tailed Sunbird	*Aethopyga ignicauda*	BLSF, MBLTF	6
21.	Yellow-breasted Greenfinch	*Carduelis spinoides*	WGL. AGRL	8
22.	Spot-winged Grosbeak	*Mycerobas melanozanthos*	BLSF	5
23.	Tibetan Siskin	*Carduelis thibetana*	BLSF	2
24.	Common Rosefinch	*Carpodacus erythrinus*	AGRL, WGL	4
25.	Scarlet Finch	*Haematospiza sipahi*	BLSF	5
26.	Pink-browed Rosefinch	*Carpodacus rodochrous*	MBLTF	6
27.	Dark-breasted Rosefinch	*Carpodacus nipalensis*	WGL	4
28.	Little Bunting	*Emberiza pusilla*	AGRL, WGL	6
29.	Grey Wagtail	*Motacilla cinerea*	WL	4

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
30.	White Wagtail	*Motacilla alba*	WL	5
31.	White-throated Laughingthrush	*Garrulax albogularis*	BLSF, MBLTF	6
32.	White-crested Laughingthrush	*Garrulax leucolophus*	BLSF, WGL	6
33.	Chestnut-crowned Laughingthrush	*Garrulax erythrocephalus*	WL, BLSF	4
34.	Whiskered Yuhina	*Yuhina flavicollis*	MBLTF, BLSF	7
35.	Stripe-throated Yuhina	*Yuhina gularis*	MBLTF	7
36.	Rufous Sibia	*Heterophasia capisrata*	MBLTF, BLSF	7
37.	White-browed Fulvetta	*Alcippe vinipectus*	BLSF	5
38.	Chestnut-headed Tesia	*Tesia castaneocoronata*	BLSF	4
39.	Buff-barred Warbler	*Phylloscopus pulcher*	MBLTF, BLSF	6
40.	Grey-hooded Warbler	*Seicercus xanthoschistos*	BLSF, MBLTF	8
41.	Oriental Magpie Robin	*Copsychus saularis*	HHE, WGL, BLSF	14
42.	Black-throated Tit	*Aegithalos concinnus*	BLSF, MBLTF	12
43.	Chestnut-bellied Nuthatch	*Sitta castanea*	BLSF	5
44.	White-tailed Nuthatch	*Sittta himalayensis*	MBLTF	4
45.	Paddyfield Pipit	*Anthus rufulus*	AGRL	3
46.	Green-tailed Sunbird	*Aethopyga nipalensis*	MBLTF, BLSF	6
47.	House Sparrow	*Passer domesticus*	HHE,AGRL, WGL	41
48.	Eurasian Tree Sparrow	*Passer montanus*	AGRL, WGL	15
49.	Barn Swallow	*Hirundo rustica*	AGRL, HHE, WL	18
50.	Black Drongo	*Dicrurus macrocercus*	HHE, AGRL, WGL	8
51.	Common Myna	*Acridotheres tristis*	HHE, AGRL, BLSF, WGL	44

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
52.	Jungle Mynah	*Acridotheres fuscus*	HHE, AGRL, WGL, BLSF	24
53.	House Crow	*Corvus splendens*	HHE, AGRL	31
54.	Eurasian Jay	*Garrulus glandarius*	BLSF, MBLTF	7
55.	Long-tailed Minivet	*Pericrocotus ethologus*	BLSF, MBLTF	12
56.	Himalayan Bulbul	*Pycnonotus leucogenys*	BLSF, WGL	9
57.	Red-vented Bulbul	*Pycononotus cafer*	AGRL, WGL, BLSF	14
58.	Black Bulbul	*Hypsipetes leucocephalus*	BLSF, MBLTF	22
59.	Rock Pigeon	*Columba livia*	HHE, AGRL	40
60.	Spotted Dove	*Streptopelia chinensis*	HHE, AGRL, WGL	12
61.	Oriental Turtle Dove	*Streptopelia orientalis*	BLSF, AGRL, WGL	11
62.	Cattle Egret	*Bubulcus ibis*	WGL, WL	17
63.	Black-chinned Babbler	*Stachyris pyrrhops*	WGL, BLSF	4
64.	Rusty-cheeked Scimitar Babbler	*Pomatorhinus erythrogenys*	BLSF	3
65.	Striated Laughingthrush	*Garrulax striatus*	BLSF	3
66.	Chestnut-tailed Minla	*Minla strigula*	BLSF, MBLTF	6
67.	White-bellied Yuhina	*Yuhina zantholeuca*	BLSF, WL	8
68.	Rufous-winged Fulvetta	*Alcippe castaneceps*	MBLTF	18
69.	Nepal Fulvetta	*Alcippe nipalensis*	BLSF	6
70.	Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*	BLSF, WGL	8
71.	Gray Bushchat	*Saxicola ferrea*	BLSF	3
72.	Green-backed Tit	*Parus monticolus*	BLSF, WGL	5
73.	Black-lored Tit	*Parus xanthogenys*	BLSF, WGL	6
74.	Brown-throated Treecreeper	*Certhia discolor*	MBLTF	2

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
75.	Fire-breasted Flowerpecker	*Dicaeum ignipectus*	BLSF	6
76.	Oriental White-eye	*Zosterops palpebrosus*	BLSF, WGL	5
77.	Long-tailed Shrike	*Lanius schach*	WGL, HHE, AGRL	5
78.	Ashy Drongo	*Dicrurus leucophaeus*	BLSF	1
79.	Jungle Crow	*Corvus macrorhynchos*	HHE	3
80.	Red-billed Blue Magpie	*Urocissa erythrorhyncha*	BLSF, WGL	5
81.	Grey Treepie	*Dendrocitta formosae*	MBLTF, WGL	5
82.	Scarlet Minivet	*Pericrocotus flammeus*	BLSF, HHE	12
83.	Mountain Bulbul	*Hypsipetes mcclellandii*	BLSF	6
84.	House Swift	*Apus affinis*	HHE, WGL	5
85.	Great Barbet	*Megalaima virens*	BLSF	1
86.	Grey-headed Woodpecker	*Picus canus*	BLSF	2
87.	Fulvous-breasted Woodpecker	*Dendrocopos macei*	BLSF, WGL	2
88.	Kalij Pheasant	*Lophura leucomelanos*	BLSF, MBLTF	8
89.	Spiny Babbler	*Turdoides nipalensis*	BLSF	1
90.	Green Shrike Babbler	*Pteruthius xanthochlorus*	MBLTF	1
91.	Gray-sided Laughingthrush	*Garrulax caerulatus*	BLSF	2
92.	Streaked Laughingthrush	*Garrulax lineatus*	AGRL, WGL	2
93.	Red-billed Leiothrix	*Leiothrix lutea*	BLSF	2
94.	Hoary-throated Barwing	*Actinodura nipalensis*	BLSF	3
95.	Blue-winged Minla	*Minla cyanouroptera*	BLSF	6
96.	Pigmy Blue Flycatcher	*Muscicapella hodgsoni*	BLSF	3
97.	Grey-bellied Tesia	*Tesia cyaniventer*	BLSF	4

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
98.	Common Tailorbird	*Orthotomus sutorius*	WGL, BLSF	4
99.	Chestnut-crowned Warbler	*Seicercus castaniceps*	BLSF	6
100.	Black-faced Warbler	*Abroscopus schisticeps*	MBLTF, BLSF	10
101.	Spotted Forktail	*Enicurus maculatus*	WL	2
102.	Pied Bushchat	*Saxicola caprata*	WGL, AGRL,	2
103.	Blue Whistling Thrush	*Myophonus caeruleus*	BLSF, WL	3
104.	Grey-winged Blackbird	*Turdus boulboul*	MBLTF	2
105.	Great Tit	*Parus major*	BLSF, WGL	6
106.	Yellow-browed Tit	*Sylviparus modestus*	MBLTF	4
107.	Velvet-fronted Nuthatch	*Sitta frontalis*	WGL, BLSF	7
108.	Black-breasted Sunbird	*Aethopyga saturata*	BLSF	2
109.	Scaly-brested Munia	*Lonchura punctulata*	WGL, AGRL	3
110.	Brown Bullfinch	*Pyrrhula nipalensis*	MBLTF	5
111.	Maroon Oriole	*Oriolus traillii*	BLSF	1
112.	Lanceolated Jay	*Garrulus lanceolatus*	MBLTF	1
113.	Large Cuckooshrike	*Coracina macei*	WGL	2
114.	Orange-bellied Leafbird	*Chloropsis hardwickii*	BLSF	4
115.	Mountain Scops Owl	*Otus spilocephalus*	BLSF, MBLTF	2
116.	Collared Owlet	*Glaucidium brodiei*	BLSF, MBLTF	2
117.	Common Hoopoe	*Upupa epops*	AGRL, WGL	2
118.	White-throated Kingfisher	*Halcyon smyrnensis*	WL, AGRL	2
119.	Golden-throated Barbet	*Megalaima franklinii*	MBLTF, BLSF	3
120.	Blue-throated Barbet	*Megalaima asiatica*	BLSF, WGL	1
121.	Speckled Piculet	*Picumnus innominatus*	WGL, BLSF	6
122.	Darjeeling Woodpecker	*Dendrocopos darjellensis*	MBLTF	3
123.	Crimson-breasted Woodpecker	*Dendrocopos cathpharius*	BLSF, MBLTF	4
124.	Black Eagle	*Ictinaetus malayensis*	BLSF, MBLTF	2

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
125.	Mountain Hawk Eagle	*Spizaetus nipalensis*	WGL, BLSF	2
126.	Besra	*Accipiter virgatus*	WGL, BLSF	1
127.	Oriental Honey Buzzard	*Pernis ptilorhyncus*	BLSF	1
				846

4.1.4 Bird Diversity During Spring Season

Altogether 107 species of birds (66.45%) were observed during spring season (Table 4.4). Species diversity index of spring was found to be 1.8821 and the relative diversity was found to be 0.9274. The highest number of individuals (46) was represented by *Passer domesticus* and the lowest number of individual (1) was represented by *Niltava grandis, Picus flavinucha, Ictinaetus malayensis, Spizaetus nipalensis* each. During this season the total number of individuals was found to be 807.

Table 4.4: Bird Diversity During Spring 2005

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
1.	Black Kite	*Milvus migrans*	HHE, BLSF, MBLTF	6
2.	Greenish Warbler	*Phylloscopus trochiloides*	MBLTF	8
3.	White-throated Laughingthrush	*Garrulax ablogularis*	BLSF, MBLTF	4
4.	White-crested Laughingthrush	*Garrulax leucolophus*	BLSF, WGL	4
5.	Chestnut-crowned Laughingthrush	*Garrulax erythrocephalus*	BLSF	3
6.	Whiskered Yuhina	*Yuhina flavicollis*	MBLTF, BLSF	12
7.	Rufous Sibia	*Heterophasia capistrata*	MBLTF, BLSF	6
8.	White-browed Fulvetta	*Alcippe vinipectus*	MBLTF, BLSF	8
9.	Chestnut-headed Tesia	*Tesia castaneocoronata*	BLSF	2
10.	Grey-hooded Warbler	*Seicercus*	MBLTF, BLSF	7

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
		xanthoschistos		
11.	Oriental Magpie Robin	*Copsychus saularis*	HHE, BLSF, WGL	10
12.	Black-throated Tit	*Aegithalos concinnus*	BLSF, MBLTF	7
13.	Chestnut-bellied Nuthatch	*Sitta castanea*	BLSF	2
14.	White-tailed Nuthatch	*Sitta himalayensis*	MBLTF	3
15.	Paddyfield Pipit	*Anthus rufulus*	AGRL	5
16.	Green-tailed Sunbird	*Aethopyga nipalensis*	MBLTF	4
17.	House Sparrow	*Passer domesticus*	HHE, AGRL, WGL	46
18.	Eurasian Tree Sparrow	*Passer montanus*	AGRL, WGL	18
19.	Barn Swallow	*Hirundo rustica*	AGRL, HHE, WL	22
20.	Black Drongo	*Dicrurus macrocercus*	AGRL, HHE, WGL	6
21.	Common Myna	*Acridotheres tristis*	HHE, AGRL, BLSF, WGL	40
22.	Jungle Myna	*Acridotheres fuscus*	HHE, AGRL, BLSF, WGL	22
23.	House Crow	*Corvus splendens*	HHE, AGRL	23
24.	Eurasian Jay	*Garrulus glandarius*	BLSF, MBLTF	12
25.	Long-tailed Minivet	*Pericrocotus ethologus*	BLSF, MBLTF	8
26.	Himalayan Bulbul	*Pycnonotus leucogenys*	BLSF, MBLTF	12
27.	Red-vented Bulbul	*Pycnonotus cafer*	WGL, BLSF, AGRL, MBLTF	15
28.	Black Bulbul	*Hypsipetes leucocephalus*	BLSF, MBLTF	18
29.	Rock Pigeon	*Columba livia*	HHE, AGR	40
30.	Spotted Dove	*Streptopelia*	HHE, AGRL,	7

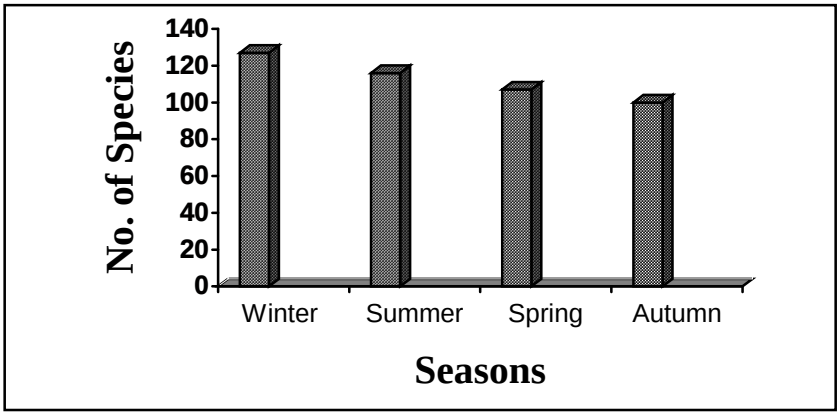
S.N.	Common Name	Scientific Name	Habitat	Pop[n]
		chinensis	WGL	
31.	Oriental Turtle Dove	*Streptopelia orientalis*	WGL, AGRL, BLSF	4
32.	Cattle Egret	*Bubulcus ibis*	WGL, WL	16
33.	Black-chinned Babbler	*Stachyris pyrrhops*	BLSF, MBLTF	5
34.	Rusty-cheeked Scimitar Babbler	*Pomatorhinus erythrogenys*	BLSF, MBLTF	7
35.	Striated Laughingthrush	*Garrulax striatus*	BLSF, MBLTF	5
36.	Chestnut-tailed Minla	*Minla strigula*	MBLTF	4
37.	White-bellied Yuhina	*Yuhina zantholeuca*	BLSF, WL	10
38.	Rufous winged Fulvetta	*Alcippe castaneceps*	MBLTF	15
39.	Nepal Fulvetta	*Alcippe nipalensis*	MBLTF, BLSF	7
40.	Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*	WGL, BLSF,	3
41.	White-throated Fantail	*Rhipidura albicollis*	BLSF	2
42.	Gray Bushchat	*Saxicola ferrea*	MBLTF	6
43.	Green-backed Tit	*Parus monticolus*	MBLTF	8
44.	Black-lored Tit	*Parus xanthogenys*	MBLTF, BLSF	9
45.	Brown-throated Treecreeper	*Certhia discolor*	MBLTF	6
46.	Fire-breasted Flowerpecker	*Dicaeum ignipectus*	MBLTF	8
47.	Oriental White-eye	*Zosterops palpebrosus*	MBLTF, BLSF	7
48.	Long-tailed Shrike	*Lanius schach*	BLSF, WGL, HHE	6
49.	Ashy Drongo	*Dicrurus leucophaeus*	MBLTF	3
50.	Jungle Crow	*Corvus macrorohynchos*	HHE, AGRL, MBLTF	5
51.	Red-billed Blue Magpie	*Urocissa erythrorhyncha*	MBLTF	2
52.	Grey Treepie	*Dendrocitta formosae*	MBLTF, BLSF, HHE	6

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
53.	Scarlet Minivet	*Pericrocotus flammeus*	MBLTF	12
54.	Mountain Bulbul	*Hypispetes mcclellandii*	MBLTF, BLSF	9
55.	House Swift	*Apus affinis*	HHE, WGL	17
56.	Great Barbet	*Megalaima virens*	HHE, WGL, MBLTF	6
57.	Grey-headed Woodpecker	*Picus canus*	MBLTF, WGL, BLSF	5
58.	Fulvous-breasted Woodpecker	*Dendrocopos macei*	BLSF, WGL	4.
59.	Kalij Pheasant	*Lophura leucomelanos*	MBLTF	6
60.	Spiny Babbler	*Turdoides nipalensis*	BLSF, MBLTF	2
61.	Grey-throated Babbler	*Stachyris nigriceps*	BLSF	4
62.	Streak-breasted Scimitar Babbler	*Pomatorhinus ruficollis*	BLSF, MBLTF	4
63.	Black-eared Shrike Babbler	*Pteruthius melanotis*	BLSF, MBLTF	7
64.	White-browed Shrike Babbler	*Pteruthius flaviscapis*	BLSF, MBLTF	3
65.	Rufous-chinned Laughingthrush	*Garrulax rufogularis*	BLSF, MBLTF	8
66.	Gray-sided Laughingthrush	*Garrulax caerulatus*	MBLTF, BLSF	6
67.	Streaked Laughingthrush	*Garrulax lineatus*	WGL, MBLTF	2
68.	Red-billed Leiothrix	*Leiothrix lutea*	MBLTF, BLSF	3
69.	Hoary-throated Barwing	*Actinodura nipalensis*	MBLTF	8
70.	Blue-winged Minla	*Minla cyanouroptera*	MBLTF	12
71.	Large Niltava	*Niltava grandis*	MBLTF	1
72.	Small Niltava	*Niltava macgrigoriae*	BLSF, WGL	4
73.	Rufous-bellied Niltava	*Niltava sundara*	MBLTF	6
74.	Common Tailorbird	*Orthotomus sutorius*	WGL, BLSF, HHE	7
75.	Chestnut-crowned Warbler	*Seicercus castaniceps*	MBLTF	5
76.	Black-faced Warbler	*Abroscopus*	MBLTF	12

S.N.	Common Name	Scientific Name	Habitat	Pop[n]
		schisticeps		
77.	Spotted Forktail	*Enicurus maculatus*	WL	3
78.	Pied Bushchat	*Saxicola caprata*	WGL, AGRL	5
79.	Blue Whistling Thrush	*Myophonus caeruleus*	BLSF, WL	2
80.	Grey-winged Blackbird	*Turdus boulboul*	MBLTF	6
81.	Great Tit	*Parus major*	BLSF, WGL, MBLTF	6
82.	Yellow-browed Tit	*Sylviparus modestus*	MBLTF	6
83.	Velvet-fronted Nuthatch	*Sitta frontalis*	BLSF, WGL	8
84.	Plain Flowerpecker	*Dicaeum concolor*	BLSF, WGL	6
85.	Black-breasted Sunbird	*Aethopyga saturata*	BLSF	4
86.	Brown Bullfinch	*Pyrrhula nipalensis*	MBLTF	7
87.	Bronzed Drongo	*Dicrurus aeneus*	BLSF, WGL	4
88.	Lanceolated Jay	*Garrulus lanceolatus*	MBLTF, BLSF	2
89.	Large Cuckooshrike	*Coracina macei*	WGL, AGRL	3
90.	Orange-bellied Leafbird	*Chloropsis hardwickii*	BLSF, MBLTF	5
91.	Collared Owlet	*Glaucidium brodiei*	MBLTF	2
92.	Commn Hoopoe	*Upupa epops*	AGRL HH	3
93.	Golden-throated Barbet	*Megalaima franklinii*	MBLTF	4
94.	Blue-throated Barbet	*Megalaima asiatica*	BLSF, HHE	2
95.	Speckled Piculet	*Picumnus innominatus*	BLSF,WGL	5
96.	Darjeeling Woodpecker	*Dendrocopos darjellensis*	MBLTF	4
97.	Crimson-breasted Woodpecker	*Dendrocopos cathpharius*	BLSF, MBLTF	5
98.	Greater Yellownape	*Picus flavinucha*	BLSF	1
99.	Bay Woodpecker	*Blythipicus pyrrhotis*	MBLTF, BLSF	2
100.	Hill Partridge	*Arborophila torqueola*	MBLTF	2
101.	Black Eagle	*Ictinaetus malayensis*	BLSF	1

S.N.	Common Name	Scientific Name	Habitat	Pop^{n}
102.	Mountain Hawk Eagle	*Spizaetus nipalensis*	BLSF	1
103.	Oriental Honey Buzzard	*Pernis ptilorhyncus*	WGL, BLSF	3
104.	Indian Cuckoo	*Cuculus micropterus*	WGL, BLSF	4
105.	Eurasian Cuckoo	*Cuculus canorus*	WGL, BLSF	2
106.	Asian Koel	*Eudynamys scolopacea*	WGL, AGRL	4
107.	Red-rumped Swallow	*Hirundo daurica*	AGRL, WL, HHE, WGL	18
				807

Fig. 4.1: Bird Species-richness in Different Seasons



4.2 Avian Diversity in Different Habitats of the Study Area

The number of bird species was found to be highest in broadleaved subtropical forest 106 (65.83%) followed by moist broadleaved lower temperate forest 86 (53.14%), wooded grassland 61 (37.88%), agricultural land 31 (19.25%), human habitation edge 21 (13.04%) and wetland 17 (10.55%) Fig 4.2. Species diversity index was found to be highest in broadleaved subtropical forest (1.9035), followed by moist broadleaved lower temperate forest (1.7874), wooded grassland (1.5842) agricultural land (1.2471), wetland (1.0626) and human habitation edge (0.9896). Similarly relative diversity was found to be highest in broadleaved subtropical forest (0.9398), followed by moist broadleaved lower temperate forest (0.9240), wooded grassland

(0.8873) wetland (0.8636) agricultural land (0.8362) and human habitation edge (0.7485).

Number of individual species was found to be highest in broadleaved subtropical forest (928) followed by moist broadleaved lower temperate forest (793), human habitation edge (554), wooded grassland (429), agricultural land (395) and wetland (126) table 4.5.

The highest number of individuals in broadleaved subtropical forest was represented by *Hypsipetes leucocephalus* (37) and the lowest number of individuals (1) was represented by *Garrulax lineatus, Zoothera wardii, Lanius schach, Garrulus lanceolatus, Otus spilocephalus* and *Glaucidium brodiei*. Similarly the highest number of individual species in moist broadleaved lower temperate forest was represented by *Alcippe castaneceps*, (55 individuals) and the lowest number of individual (1) was represented by *Spizaetus nipalensis, Blythipicus pyrrhotis, Oriolus traillii* each. In wooded grassland the highest number of individuals (35) was represented by *Passer montanus* and the lowest number of individuals (1) is represented by *Dicrurus aeneus, Upupa epops, Accipiter virgatus and Pernis ptilorhyncus* each.

In agricultural land, the highest number of individuals (53) was represented by *Passer domesticus* and the lowest number of individuals (1) was represented by *Garrulax lineatus, Accipiter virgatus, Halcyon smyrnensis, Surniculus lugubris* each. Similarly in human habitation edge the highest number of individuals (166) was represented by *Passer domesticus* and the lowest number of individuals (1) was represented by *Saxicola caprata* and *Upupa epops* each. Similarly in wetland, the highest number of individuals (31) was represented by *Bubulcus ibis* and the lowest number of individuals (1) was represented by *Streptopelia orientalis* and *Zoothera wardii* each.

Plate 7: Black Drongo (*Dicrurus macrocercus*) resting on electric wire near a village area

Plate 8: Oriental Turtle Dove (*Streptopelia orientalis*) resting on dry bamboo shoot near cultivation of the study area

Plate 9: Red-vented Bulbul (*Pycnonotus cafer*) near cultivation of the study area

Plate 10: Female Pied Bushchat (*Saxicola caprata*) perched on the top of bush near cultivation of the study area.

Plate 11: White-throated king fisher (*Halcyon smyrnensis*) near cultivation of the study area

Table 4.5: Avian Diversity in Different Habitats of Godawari

S.N.	Habitats	BLSF				WGL				HH				AGR				WL				MBLTF			
	Seasons / Species	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
1.	Spiny Babbler	2	2	1	1																	1	2		1
2.	Grey-throated Babbler		7		4																	6			
3.	Black-chinned Babbler	1	1	3	3	1	1	1														2			2
4.	Streak-breasted Scimitar Babbler	2	2		2																	4	1		2
5.	Rusty-cheeked Scimitar Babbler	2	2	3	4																	3	1		3
6.	Green-shrike Babbler																					2		1	
7.	Black-eared Shrike Babbler		2		4																	6	2		3
8.	White-browed Shrike Babbler		4		2																	8	2		1
9.	White-throated Laughingthrush	2	4	4	2																	2	3	2	2
10.	White-crested Laughingthrush	3	5	5	3	2	3	1	1																
11.	Striated Laughingthrush	2	2	3	3																				2
12.	Rufous-chined Laughingthrush	3	4		4																	2			4
13.	Gray-sided Laughingthrush	3	2	2	4																	4			2
14.	Streaked Laughingthrush		1				1	1	1							1						1			1
15.	Chestnut-crowned Laughingthrush			2	3														2	2		7	4		
16.	Red-billed Leiothrix			2	2																	4			1
17.	Hoary Barwing			3																		7			8

S.N.	Habitats	BLSF				WGL				HH				AGR				WL				MBLTF			
	Seasons / Species	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
18.	Blue-winged Minla			6																		6			12
19.	Chestnut-tailed Minla		2	3																		2	3	3	4
20.	Whiskered Yuhina	6	10	4	7																	8	6	3	5
21.	Stripe-throated Yuhina																					4	6	7	
22.	White-bellied Yuhina	3	2	6	7													3	2	2	3				
23.	Rufous Sibia	3	6	5	4																	4	3	2	2
24.	Rufous-winged Fulvetta			4																		12	14	14	15
25.	White-browed Fulvetta	2	4	5	4																	2	5		4
26.	Nepal Fulvetta	2	5	6	3																	4	3		4
27.	Dark-sided Flycatcher																					4			
28.	Rufous-gorgeted Flycatcher																							3	
29.	Red-throated Flycatcher			2				2																	
30.	Snowy-browed Flycatcher																					2			
31.	Ultramarine Flycatcher																					2			
32.	Verditer Flycatcher	5				3																			
33.	Grey-headed Canary Flycatcher	3	4	5	1	2	2	3	2																
34.	Large Niltava																					2			1
35.	Small Niltava	2	3		3	1			1																
36.	Rufous-bellied Niltava																					8	4		6

S.N.	Habitats	BLSF				WGL				HH				AGR				WL				MBLTF			
	Seasons / Species	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
37.	White-throated Fantail	2	3		2																				
38.	Yellow-bellied Fantail			2																					
39.	Pygmy Blue Flycatcher			3																		2			
40.	Chestnut-headed Tesia	5	6	4	2																				
41.	Grey-bellied Tesia	3	2	4														3							
42.	Aberrant Bush Warbler			2				2																	
43.	Grey-sided Bush Warbler			4																					
44.	Common Tailorbird	1	6	2	3	3	3	2	2	1			2												
45.	Blyth's Leaf Warbler																					4			
46.	Buff-barred Warbler			3																		6		3	
47.	Ashy-throated Warbler			10																4					
48.	Yellow-browed Warbler			8				4																	
49.	Greenish Warbler																								8
50.	Golden-spectacled Warbler			8																					
51.	Grey-hooded Warbler	6	4	5	3																	8	4	3	4
52.	Chestnut-crowned Warbler			6																		6	5		5
53.	Black-faced Warbler		8	6																		8	4	4	12
54.	Golden Bush Robin			4																					
55.	Orange-flanked Bush Robin			3				3																	

S.N.	Habitats	BLSF				WGL				HH				AGR				WL				MBLTF			
	Seasons / Species	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
56.	Oriental Magpie Robin	3	4	4	2	3	3	4	5	4	5	6	3												
57.	Blue-fronted Redstart							2																	
58.	Hodgson's Redstart							4								2									
59.	White-capped Water Redstart																			5					
60.	Plumbeous Water Redstart																			4					
61.	Spotted Forktil																	7	4	2	3				
62.	Pied Bushchat					1	2	1	2	1				2	1	1	3								
63.	Gray Bushchat	3	4	3																		3	2		6
64.	Stone Chat															4									
65.	Blue Whistling Thrush	1	2	2	1													1	2	1	1				
66.	Orange-headed Thrush																					3			
67.	Pied Thrush	1																1							
68.	Tickell's Thrush																					2			
69.	Grey-winged Blackbird																					3	2	2	6
70.	Scaly Thrush																	2				2			
71.	Dark-throated Thrush			3				2								2									
72.	Rufous-breasted Accentor																							2	
73.	Great Tit	4	2	4	2	2	2	2	2																2
74.	Green-backed Tit	3	3	2				3														4	2		8

S.N.	Habitats	BLSF				WGL				HH				AGR				WL				MBLTF			
	Seasons / Species	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
75.	Black-lored Tit	2	4	4	5	2	4	2																	4
76.	Yellow-browed Tit																						2	4	6
77.	Black-throated Tit	6	4	6	4																	8	5	6	3
78.	Chestnut-bellied Nuthatch	7	4	5	2																				
79.	White-tailed Nuthatch																					4	7	4	3
80.	Velvet-fronted Nuthatch	4	7	5	5	2	2	2	3																
81.	Brown-throated Treecreeper																					3	3	2	6
82.	White Wagtail																			5					
83.	Grey Wagtail																		3	4					
84.	Paddyfield Pipit													6	6	3	5								
85.	Olive-backed Pipit			4																				7	
86.	Plain Flowerpecker	3			2	2			4																
87.	Fire-breasted Flowerpecker	3	4	6																		3			8
88.	Yellow-bellied Flowerpecker							3																	
89.	Fire-tailed Sunbird			4																				2	
90.	Green-tailed Sunbird			3																		4	4	3	4
91.	Black-throated Sunbird		2	2	4																				
92.	Oriental White-eye	2	4	2	3		3	3														4			4
93.	House Sparrow					9	10	7	8	41	26	25	24	16	14	9	14								

S.N.	Habitats	BLSF				WGL				HH				AGR				WL				MBLTF			
	Seasons / Species	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
94.	Eurasian Tree Sparrow					14	6	7	8					22	12	8	10								
95.	Scaly-breasted Munia	4				4								2		3									
96.	Yellow-breasted Greenfinch							2								6									
97.	Spot-winged Grosbeak			5																					
98.	Tibetan Siskin			2																					
99.	Scarlet Finch			5																					
100.	Common Rosefinch							2								2									
101.	Pink-browed Rosefinch																							6	
102.	Brown Bullfinch																						6	5	7
103.	Dark-bareasted Rosefinch							4																	
104.	Little Bunting							2								4									
105.	Barn Swallow									30	10	12	16	8	8	2	2	6	4	4	4				
106.	Red-rumped Swallow					2			6	10			4	8			6	4			2				
107.	Long-tailed shrike				1	2	1	2	4	1	1	1	1	3	1	2									
108.	Maroon Oriole	1		1																		1			
109.	Black Drongo					3	1	2	2	2	1	2	1	5	2	4	3								
110.	Ashy Drongo	2	1	1																		1	1		3
111.	Bronzed Drongo	3			3				1																
112.	Common Mynah	6	4	6	8	8	8	12	6	13	18	18	16	11	12	8	10								

S.N.	Habitats	BLSF				WGL				HH				AGR				WL				MBLTF			
	Seasons / Species	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
113.	Jungle Mynah	6	7	6	4	4	5	5	3	2	3	7	8		3	6	7								
114.	House Crow	2						7		19	21	19	14	5	7	5	9								
115.	Jungle Crow									2	1	3	2		1		2					2			1
116.	Red-billed Blue Magpie	4	6	3				2														2	2		2
117.	Eurasian Jay	2	6	4	7																	4	2	3	5
118.	Grey Treepie	7	4	3	3	2		2			2		1												2
119.	Lanceolated Jay				1																			1	1
120.	Large Cuckooshrike						1	2	1						1		2								
121.	Long-tailed Minivet	3	8	7	5																	5	6	5	3
122.	Scarlet Minivet											2										8	5	10	12
123.	Orange-bellied Leafbird			4	3																				2
124.	Himalayan Bulbul	3	4	6	8		2	3														3			4
125.	Red-vented Bulbul	7	5	6	3	5	3	4	4					6	8	4	4					4			4
126.	Mountai Bulbul	4	3	6	4																	2			5
127.	Black Bulbul	5	8	14	10																	7	6	8	8
128.	Rock Pigeon									21	26	28	32	9	10	12	8								
129.	Spotted Dove	2				2	5	4	2	1	2	3	2	3	3	5	3								
130.	Oriental Turtle Dove	2	2	6	2	2	1	3	1					2	2	2	1	1							
131.	Large Hawk cuckoo																					3			

S.N.	Habitats	BLSF				WGL				HH				AGR				WL				MBLTF			
	Seasons / Species	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
132.	Indian Cuckoo	2			2	2			2																
133.	Eurasian Cuckoo	3				1			2																
134.	Oriental Cuckoo					2																			
135.	Drongo Cuckoo					3								1											
136.	Koel Cuckoo					1			2					1			2								
137.	Mountain Scops Owl			1																		1	1	1	
138.	Collared Owlet			1																			1	1	2
139.	House Swift					10	7	2	5	8	7	3	12												
140.	Hoopoe							1					1		1	1	2								
141.	White-throated Kingfisher															1		2	1	1					
142.	Great Barbet	4	3	1			2		3	1			1									2	3		2
143.	Golden-throated Barbet			2																		2		1	4
144.	Blue-throated Barbet			1	1		2				1		1												
145.	Speckled Piculet	2	1	4	3	1	1	2	2																
146.	Darjeeling Woodpecker																					4	3	3	4
147.	Crimson-breasted Woodpecker		2	2	3																	1	2	2	2
148.	Grey-headed Woodpecker	2	3	2	1				2													4	2		2
149.	Fulvous-breasted Woodpecker	3	2	1	2			1	2													3			
150.	Greater Yellownape	1	2		1	1	1																		

S.N.	Habitats	BLSF				WGL				HH				AGR				WL				MBLTF			
	Seasons / Species	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
151.	Bay Woodpecker	1	1		1																				1
152.	Hill Partridge																					2	2		2
153.	Kalij Pheasant	3	3	5																		2	2	3	6
154.	Cattle Egret					6	4	8	9									7	8	9	7				
155.	Crested Serpent Eagle	3																							
156.	Black Eagle		2	1	1																		1	1	
157.	Mountain Hawk Eagle			1	1		1	1															1		
158.	Black Kite		2		1						1		2										1		3
159.	Besra	2		1			1								1										
160.	Oriental Honey Buzzard		1	1	2				1																
161.	Common Kestrel														2										

Note: I - Summer
II - Autumn
III - Winter
IV - Spring

Fig. 4.2: Bird Species-richness in Different Habitats of the Study Area

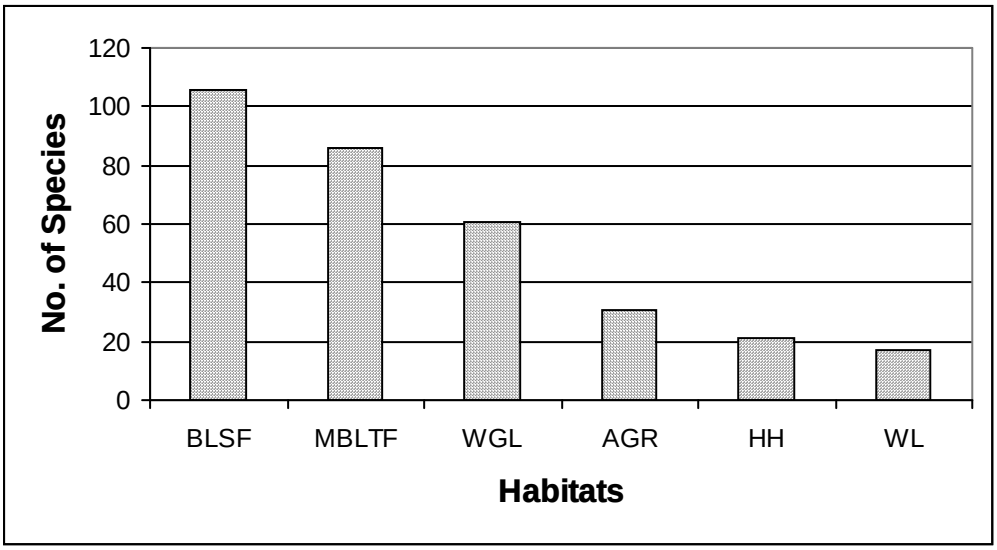


Table 4.6: Number of Bird Species of the following orders and families

S.N.	Orders		Family	NBS
1	Passeriformes	1.	Timaliidae	26
		2.	Muscicapidae	13
		3.	Sylviidae	14
		4.	Turdidae	18
		5.	Prunellidae	1
		6	Paridae	5
		7.	Sittidae	3
		8.	certhiidae	1
		9.	Motacillidae	4
		10.	Diacaeidae	3
		11.	Nectariniidae	3
		12.	Zosteropidae	1
		13.	Ploceidae	3
		14.	Fringillidae	8
		15.	Emberizidae	1
		17	Hirundinidae	2
		18	Laniidae	1
		19	Oriolidae	1
		20	Dicruridae	3
		21.	Sturnidae	2

		22	Corvidae	6
		23	Campephagidae	3
		24	Irenidae	1
		25	Pycnonotidae	4
2	Columbiformes	26	columbidae	3
3	Cuculiformes	27	Cuculidae	6
4	Strigiformes	28	strigidae	2
5.	Apodiformes	29	Apodiadae	1
6	Upupiformes	30	Upupidae	1
7.	Coraciiformes	31	Alcedinidae	1
8.	Piciformes	32	Capitonidae	3
		33	Picidae	7
9	Galliformes	34	Phasianidae	2
10	Ciconiiformes	35	Ardeidae	1
11	Accipitriformes	36	Accipitridae	7
			total	161

(Note : NBS = Number of Bird species)

Fig. 4.3: Number of Bird Species of the following orders and families

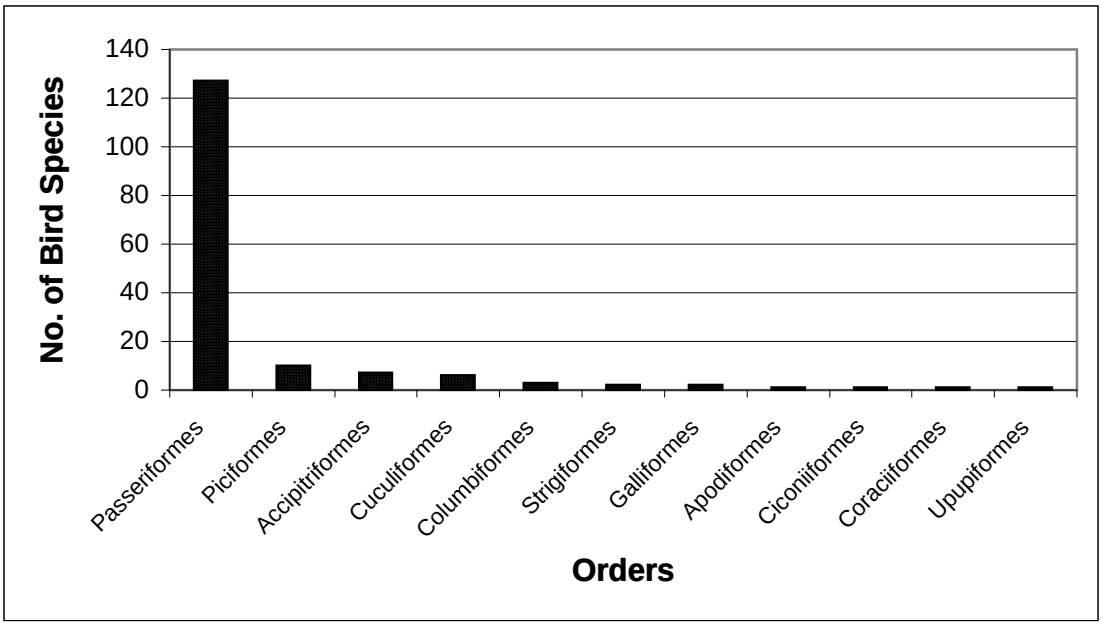


Fig. 4.4 : Number of Bird Species Represented by Status

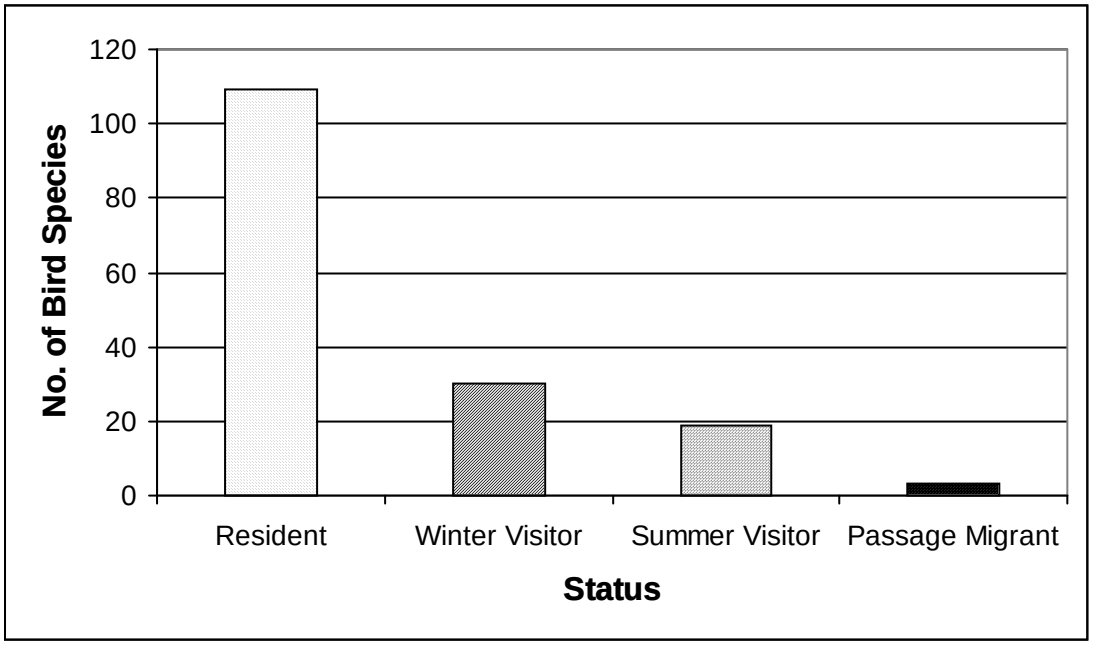


Plate 12: Kalij Pheasant
(*Lophura leucomelanos*)

Plate 13: Crimson-breasted Woodpecker
(*Dendrocopos cathpharius*)

Plate 14: Greater Yellownape
(Picus flavinucha)

Plate 15: Mountain Hawk Eagle
(*Spizaetus nipalensis*)

Plate 16: Common Kestrel
(*Falco tinnunculus*)

Plate 17: Long-tailed Minivet
(*Pericrocotus ethologus*)

Plate 18: Hodgson's Redstart
(*Phoenicurus hodgsoni*)

Plate 19: Hoary-throated Barwing
(*Actinodura nipalensis*)

Plate 20: Verditer Flycatcher
(*Eumyias thalassina*)

Plate 21: Grey-headed Canary Flycatcher
(*Culicicapa ceylonensis*)

Courtesy: Grimmett *et al.,* 2000
"Birds of Nepal" Plate 12-21

5. DISCUSSION

In the present research work, three parameters viz. seasonal bird diversity, status and bird diversity in different habitats have been comparatively evaluated. For seasonal diversity and status all four seasons (summer, autumn, winters and spring) were taken, while for species diversity in different habitats, the major six habitats (broadleaved subtropical forest, wooded grassland, human habitation edge, agricultural land, wetland and moist broadleaved lower temperature forest) were adopted. For whole research work, the line transect method was adopted.

Godawari despite its small size appears to support a rich and diverse bird community. In this study a total of 161 species (see table 4.5) belonging to 11 orders, 36 families (see 4.6) were recorded. Inskipp (1989) has reported 256 bird species from Phulchowki mountain (50 km^2). The result of the present study is in the same trend despite its small area (18 km^2). The difference can in part be attributed to the duration of the study and the size of the study area.

During the study period 109 residents, 30 winter visitors, 19 summer visitors and 3 passage migrants were recorded. The species-richness of migratory birds was recorded higher in winter than in summer. These reports indicate that most of the migratory birds visit the area during winter because of the favourable ecological and climatic conditions which exists in the area. When these favourable conditions are altered due to heat, drought, rainfall and famine conditions, the number of visiting bird species decline considerably. Natarajan (1992) and Gunawardena (1999) have also reported that the population of birds varies throughout the year depending on the climatic conditions and availability of food.

From the present study, the species diversity of birds in winter was recorded higher than the other seasons. Species diversity of the four seasons was dominated by winter (1.9355), followed by spring (1.8821) summer (1.8786) and autumn (1.8219). The highest relative diversity index was found in spring (0.9274), followed by winter (0.9200), autumn (0.9109) and summer (0.9100). This shows that the winter season was the most favourable and the autumn was the least favourable seasons for birds in

the study area. Inskipp (1989) also supports that the forests are of considerable importance for wintering birds and passage migrants.

Vegetation is one of the main factors affecting the survival of wild life and their population distribution (Oli, 1999). The structure of the bird population as well as diversity may be related to the structure of the vegetation as well as biomass production of ground vegetation. The variation in diversity of ground vegetation is dependent upon seasonal changes. Vegetation is least in spring, moderate in summer and optimum in winter as reported by Adhikari (1999) at KTWR and Joshi (1995) at RCNP. This may be the another contributing factor for the high species richness in winter season than other seasons.

Among the six habitat type (s) in the study area, species diversity index was dominated by broadleaved subtropical forest (1.9035), followed by moist broadleaved lower temperate forest (1.7874), wooded grassland (1.5842), agricultural area (1.2471), wetland (1.0626) and human habitation edge (0.9896). Similarly relative diversity index was also found to be highest in broadleaved subtropical forest (0.9398), followed by moist broadleaved lower temperate forest (0.9240), wooded grassland (0.8873), wetland (0.8636), agricultural area (0.8362) and human habitation edge (0.7485). About 77% of Nepal's breeding bird species, 67 percent of wintering bird species and 93 percent of those for which Nepal may hold internationally significant breeding populations utilize forests and shrubs and only 16 percent of all forest birds which have adapted to breed in habitats heavily modified or created by man such as groves, gardens, scrub and trees and bushes at the edges of cultivation (Inskipp, 1989). With 68% of nationally threatened birds depending on forest, loss and deterioration of the latter are major threats to the country's birds. Many of the threatened species require plenty of undergrowth, moist conditions or trees covered in epiphytes (Baral 2000). Some birds like Blue Whistling Thrush are very common resident species in our country but in the particular area the species was seen in very less number. Possible cause may be lack of feeding guild and particular habitat requirements due to logging and fragmentation. According to Castelletta, Sodhi and Subaraj (2000) such type of problems on avifauna was high in Singapore. The low population of any species indicates that the habitat is not so good or may

have degrading condition. The activities of the local people at the particular area are responsible for this situation.

Regarding the distribution of bird species in the two pure forest stands (broadleaved subtropical forest and moist broadleaved lower temperate forest) of the study area, the concentration of the bird species was dominated by the subtropical forest (106 species with 928 individuals) followed by lower temperate forest (86 species with 793 individuals). This result indicates that when the altitude increases, birds species richness decreases. According to Inskipp (1989) the highest number of breeding birds of the forest are found in the tropical climate (204 species) zone of Nepal followed by subtropical (183), lower temperate (167) upper temperate (158), subalpine (103) and alpine (19).

Hunting, trapping and collection of chicks of Mynahs, Shrikes, Wood peckers, Doves etc. by herdsmen and collection of different forest products by the local people were the illegal activities that were observed during the period of field survey.

6. CONCLUSION

The present investigation was carried out with the prime objectives of assessing the diversity of birds at Godawari with seasonal variation and habitat types. To achieve this, the birds were observed throughout 11 months period. The birds were observed in four season summer, autumn, winter and spring. As per the requirement of the study each bird observation was noted along with habitat type(s) whether the birds were seen in relation to broadleaved subtropical forest, wooded grassland, human habitation edge, agricultural land, wetland and moist broadleaved lower temperate forest. Only primary data were used. Direct count method was applied to census the birds. Species diversity and relative diversity of the birds was calculated by using Shannon-Wiener function and Jacob's coefficient.

Altogether 161 birds species belonging to 11 orders and 36 families were observed in the study area. During the study period 109 residents, 30 winter visitors. 19 summer visitors and 3 passage migrants were recorded. Similarly 106, 86, 61, 31, 21 and 17 bird species were recorded from broadleaved subtropical forest, moist broadleaved lower temperate forest, wooded grassland, agricultural land, human habitation edge and wetland respectively. The species diversity index of winter was 1.9355, followed by spring 1.8821, summer 1.8786 and autumn 1.8219. The highest relative diversity index was found in spring (0.9274), followed by winter (0.9200), autumn (0.9109) and summer (0.9100). Similarly the highest species diversity index was found in broadleaved subtropical forest (1.9035) followed by moist broadleaved lower temperate forest (1.7874), wooded grassland (1.5842), agricultural land (1.2471), wetland (1.0626) and human habitation edge (0.9896).

Similarly the highest relative diversity index was found in broadleaved subtropical forest (0.9398), followed by moist broadleaved lower temperate forest (0.9240), wooded grassland (0.8873), wetland (0.8636), agricultural land (0.8362) and human habitation edge (0.7485).

Of the total 161 species recorded in the study area 19 species were threatened or near threatened. They were in NRDB and BCN categories.

7. RECOMMENDATIONS

1. The subtropical forests are especially threatened by quarries on the lower slopes. Since about 1975 they have been extensively quarried and only bare rock remains over a large section. Many worker's home and a factory have been erected below the quarry on land which was forest only a few years ago. If Phulchowki's forests and their rich variety of flora and fauna are to continue to survive their protection is urgently needed and the quarries must be closed.
2. Immediate measures are to be taken to reduce from grazing, firewood, fodder and medicinal plants collection and illegal felling of trees.
3. Most of the villagers are poor and illiterate. They need to be educated so that they can appreciate the importance of biodiversity and environmental protection. One way to augmenting their income is by convincing them to cultivate medicinal plants. As a number of well-known medicinal plants occur in the region naturally it may not be a difficult proposition. NGOs may come forward to help in this venture.
4. Severe use of pesticides in the agricultural land by villagers is the another threat to the biodiversity and environment of the area. Birds are particularly susceptible to insecticide damage. They may be killed while ingesting pesticides contaminated grains, fruits, worms and insects. Moreover use of pesticides causes the population reduction of invertebrates, which are the food sources of various types of birds. So the villagers should be discouraged to use pesticides by giving them awareness programmes.
5. Generally herdsmen were seen trapping and collecting eggs and chicks of some birds like mynahs shrikes and woodpeckers. They should be given awareness programmes regarding the ecological importance of the birds.
6. The large trees such as Bar (*Ficus benghalensis*), Peepal (*Ficus religiosa*) are proper nesting sites for raptors. So plantation of such indicator plant species, suitable for birds should be done. For this purpose local people should be given conservation education.
7. Phulchowki has been the center for wood collection for several of the valley's traditional festivals, for example Rato Machindranath's chariot. This is also a

part of environmental degradation. So concerned authority should be aware of the problem.

8. A frequent research should be encouraged to understand biodiversity, physical impact, cultural impact and other impact of human activities.
9. Local communities are putting their best efforts in conserving and managing the lower reaches of Phulchowki forest under different Community Forest User Groups (CFUGs). Recently, in collaboration with Federation of Community Forest Users, Nepal (FECOFUN) BCN is working towards proper protection and management of the Phulchowki Mountain Forests. Nepal Government can work in partnership with existing CFUGs to ensure the best protection and management of the area
10. Phulchowki mountain should be made a conservation area as soon as possible.

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Appendix-I

Chick list of Birds of the Study Area

S.N.	Common Name	Scientific Name	Threat	Status
	Timaliidae			
1.	Spiny Babbler	*Turdoides nipalensis*		R
2.	Grey-throated Babbler	*Stachyris nigriceps*		R
3.	Black-chinned Babbler	*Stachyris pyrrohops*		R
4.	Streak-breasted Scimitar Babbler	*Pomatorhinus ruficollis*		R
5.	Rusty-cheeked Scimitar Babbler	*Pomatorhinus erythrogenys*		R
6.	Green Shrike Babbler	*Pteruthius xanthochlorus*		R
7.	Black-eared Shrike Babbler	*Pteruthius melanotis*		R
8.	White-browed Shrike Babbler	*Pteruthius flaviscapis*		R
9.	White-throated Laughingthrush	*Garrulax albogularis*		R
10.	White-crested Laughingthrush	*Garrulax leucolophus*		R
11.	Striated Laughingthrush	*Garrulax striatus*		R
12.	Rufous-chined Laughingthrush	*Garrulax rufogularis*	S/NRDB	R
13.	Gray-sided Laughingthrush	*Garrulax caerulatus*	E/NRDB, V/BCN	R
14.	Streaked Laughingthrush	*Garrulax lineatus*		R
15.	Chestnut-crowned Laughingthrush	*Garrulax erythrocephalus*		R
16.	Red-billed Leiothrix	*Leiothrix lutea*	II/CITES	R
17.	Hoary-throated Barwing	*Actinodura nipalensis*		R
18.	Blue-winged Minla	*Minla cyanouroptera*		R
19.	Chestnut-tailed Minla	*Minla strigula*		R
20.	Whiskered Yuhina	*Yuhina flavicollis*		R
21.	Stripe-throated Yuhina	*Yuhina gularis*		R
22.	White-bellied Yuhina	*Yuhina zantholeuca*		R
23.	Rufous Sibia	*Heterophasia capistrata*		R
24.	Rufous-winged Fulvetta	*Alcippe castaneceps*		R
25.	White-browed Fulvetta	*Alcippe vinipectus*		R

S.N.	Common Name	Scientific Name	Threat	Status
26.	Nepal Fulvetta	*Alcippe nipalensis*		R
	Muscicapidae			
27.	Dark-sided Flycatcher	*Musciapa sibirica*		S
28.	Rufous-gorgeted Flycatcher	*Ficedula strophiata*		W
29.	Red-throated Flycatcher	*Ficedula parva*		W
30.	Snowy-browed Flycatcher	*Ficedula hyperythra*		S
31.	Ultramarine Flycatcher	*Ficedula superciliaris*		S
32.	Verditer Flycatcher	*Muscicapa thalassina*		S
33.	Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*		R
34.	Large Niltava	*Niltava grandis*	S/NRDB	R
35.	Small Niltava	*Niltava macgrigoriae*		R
36.	Rufous-bellied Niltava	*Niltava sundara*		R
37.	White-throated Fantail	*Rhipidura albicollis*		R
38.	Yellow-bellied Fantail	*Rhipidura hypoxantha*		W
39.	Pygmy Blue Flycatcher	*Muscicapella hodgsoni*	S/NRDB, V/BCN	R
	Sylviidae			
40.	Chestnut-headed Tesia	*Tesia castaneocoronata*		R
41.	Grey-bellied Tesia	*Tesia cyaniventer*		R
42.	Aberrant Bush Warbler	*Cettia flavolivacea*		W
43.	Grey-sided Bush Warbler	*Cettia brunnifrons*		W
44.	Common Tailorbird	*Orthotomus sutorius*		R
45.	Blyth's Leaf Warbler	*Phylloscopus reguloides*		S
46.	Buff-barred Warbler	*Phylloscopus pulcher*		R
47.	Ashy-throated Warbler	*Phylloscopus maculipennis*		W
48.	Yellow-browed Warbler	*Phylloscopus inornatus*		W
49.	Greenish Warbler	*Phylloscopus trochiloides*		PM
50.	Golden-spectacled Warbler	*Seicercus burkii*		W
51.	Grey-hooded Warbler	*Seicercus xanthoschistos*		R
52.	Chestnut-crowned Warbler	*Seicercus castaniceps*		R
53.	Black-faced Warbler	*Abroscopus schisticeps*		R

S.N.	Common Name	Scientific Name	Threat	Status
	Turdidae			
54.	Golden Bush Robin	*Tarsiger chrysaeus*		W
55.	Orange-flanked Bush Robin	*Tarsiger cyanurus*		W
56.	Oriental Magpie Robin	*Copsychus saularis*		R
57.	Blue-fronted Redstart	*Phoenicurus frontalis*		W
58.	Hodgson's Redstart	*Phoenicurus hodgsoni*		W
59.	White-capped Water Redstart	*Chaimarrornis leucocephalus*		W
60.	Plumbeous Water Redstart	*Rhyacornis fulginosus*		W
61.	Spotted Forktil	*Enicurus maculatus*		R
62.	Pied Bushchat	*Saxicola caprata*		R
63.	Gray Bushchat	*Saxicola ferrea*		R
64.	Stone Chat	*Saxicola torquata*		W
65.	Blue Whistling Thrush	*Myophonus caeruleus*		R
66.	Orange-headed Thrush	*Zoothera citrina*		S
67.	Pied Thrush	*Zoothera wardii*	S/NRDB	S
68.	Tickell's Thrush	*Turdus unicolor*		S
69.	Grey-winged Blackbird	*Turdus boulboul*		R
70.	Scaly Thrush	*Zoothera dauma*		S
71.	Dark-throated Thrush	*Turdus ruficollis*		W
	Prunellidae			
72.	Rufous-breasted Accentor	*Prunella strophiata*		W
	Paridae			
73.	Great Tit	*Parus major*		R
74.	Green-backed Tit	*Parus monticolus*		R
75.	Black-lored Tit	*Parus xanthogenys*		R
76.	Yellow-browed Tit	*Sylviparus modestus*		R
77.	Black-throated Tit	*Aegithalos concinnus*		R
	Sittidae			
78.	Chestnut-bellied Nuthatch	*Sitta castanea*		R
79.	White-tailed Nuthatch	*Sitta himalayensis*		R

S.N.	Common Name	Scientific Name	Threat	Status
80.	Velvet fronted Nuthatch	*Sitta frontalis*		R
	Certhiidae			
81.	Brown-throated Treecreeper	*Certhia discolor*		R
	Motacillidae			
82.	White Wagtail	*Motacilla alba*		W
83.	Grey Wagtail	*Motacilla cinerea*		W
84.	Paddyfield Pipit	*Anthus rufulus*		R
85.	Olive-backed Pipit	*Anthus hodgsonii*		W
	Dicaeidae			
86.	Plain Flowerpecker	*Dicaeum concolor*		S
87.	Fire-breasted Flowerpecker	*Dicaeum ignipectus*		R
88.	Yellow-bellied Flowerpecker	*Dicaeum melanoxanthum*	S/NRDB	W
	Nectariniidae			
89.	Fire-tailed Sunbird	*Aethopyga ignicauda*		W
90.	Green-tailed Sunbird	*Aethopyga nipalensis*		R
91.	Black-throated Sunbird	*Aethopyga saturata*		R
	Zosteropidae			
92.	Oriental White-eye	*Zosterops palpebrosus*		R
	Ploceidae			
93.	House Sparrow	*Passer domesticus*		R
94.	Eurasian Tree Sparrow	*Passer montanus*		R
95.	Scaly-breasted Munia	*Lonchura punctulata*		R
	Fringillidae			
96.	Yellow-breasted Greenfinch	*Carduelis spinoides*		W
97.	Spot-winged Grosbeak	*Mycerobas melanozanthos*		W
98.	Tibetan Siskin	*Carduelis thibetana*		W
99.	Scarlet Finch	*Haematospiza sipahi*	S/NRDB	W
100.	Common Rosefinch	*Carpodacus erythrinus*		W
101.	Pink-browed Rosefinch	*Carpodacus rhodochrous*		W
102.	Brown Bullfinch	*Pyrrhula nipalensis*		R

S.N.	Common Name	Scientific Name	Threat	Status
103.	Dark-bareasted Rosefinch	*Carpodacus nipalensis*		W
	Emberizidae			
104.	Little Bunting	*Emberiza pusilla*		W
	Hirundinidae			
105.	Barn Swallow	*Hirundo rustica*		R
106.	Red rumped Swallow	*Hirundo daurica*		S
	Laniidae			
107.	Long-tailed shrike	*Lanius schach*		R
	Oriolidae			
108.	Maroon Oriole	*Orilous traillii*		R
	Dicruridae			
109.	Black Drongo	*Dicrurus macrocercus*		R
110.	Ashy Drongo	*Dicrurus leucophaeus*		R
111.	Bronzed Drongo	*Dicrurus aeneus*		S
	Sturnidae			
112.	Common Mynah	*Acridotheres tristis*		R
113.	Jungle Mynah	*Acridotheres fuscus*		R
	Corvidae			
114.	House Crow	*Corvus splendens*		R
115.	Jungle Crow	*Corvus macrorhynchos*		R
116.	Red-billed Blue Magpie	*Urocissa erythrorhyncha*		R
117.	Eurasian Jay	*Garrulus glandarius*		R
118.	Grey Treepie	*Dendrocitta formosae*		R
119.	Lanceolated Jay	*Garrulus lanceolatus*		R
	Campephagidae			
120.	Large Cuckooshrike	*Coracina macei*		R
121.	Long-tailed Minivet	*Pericrocotus ethologus*		R
122.	Scarlet Minivet	*Pericrocotus flammeus*		R
	Irenidae			
123.	Orange-bellied Leafbird	*Chloropsis hardwickii*		R
	Pycnonotidae			

S.N.	Common Name	Scientific Name	Threat	Status
124.	Himalayan Bulbul	*Pycnonotus leucogenys*		R
125.	Red-vented Bulbul	*Pycnonotus cafer*		R
126.	Mountai Bulbul	*Hypsipetes mcclellandii*		R
127.	Black Bulbul	*Hypsipetes leucocephalus*		R
	Columbidae			
128.	Rock Pigeon	*Columba livia*		R
129.	Spotted Dove	*Streptopelia chinensis*		R
130.	Oriental Turtle Dove	*Streptopelia orientalis*		R
	Cuculidae			
131.	Large Hawk cuckoo	*Hierococcyx sparverioides*		S
132.	Indian Cuckoo	*Cuculus micropterus*		S
133.	Eurasian Cuckoo	*Cuculus canorus*		S
134.	Oriental Cuckoo	*Cuculus saturatus*		S
135.	Drongo Cuckoo	*Surniculus lugubris*		S
136.	Koel Cuckoo	*Eudynamys scolopacea*		S
	Strigidae			
137.	Mountain Scops Owl	*Otus spilocephalus*	S/NRDB, II/CITES	R
138.	Collared Owlet	*Glaucidium brodiei*	II/CITES	R
	Apodidae			
139.	House Swift	*Apus affinis*		R
	Upupidae			
140.	Common Hoopoe	*Upupa epops*		R
	Alcedinidae			
141.	White-throated Kingfisher	*Halcyon smyrnensis*		R
	Capitonidae			
142.	Great Barbet	*Megalaima virens*		R
143.	Golden-throated Barbet	*Megalaima franklinii*		R
144.	Blue-throated Barbet	*Megalaima asiatica*		R
	Picidae			
145.	Speckled Piculet	*Picumnus innominatus*	S/NRDB	R

S.N.	Common Name	Scientific Name	Threat	Status
146.	Darjeeling Woodpecker	*Dendrocopos darjellensis*		R
147.	Crimson-breasted Woodpecker	*Dendrocopos cathpharius*		R
148.	Grey-headed Woodpecker	*Picus canus*		R
149.	Fulvous-breasted Woodpecker	*Dendrocopos macei*		R
150.	Greater Yellow-nape	*Picus flavinucha*		R
151.	Bay Woodpecker	*Blythipicus pyrrhotis*	S/NRDB	R
	Phasinidae			
152.	Hill Partridge	*Arborophila torqueola*		R
153.	Kalij Pheasant	*Lophura leucomelanos*	S/NRDB	R
	Ardeidae			
154.	Cattle Egret	*Bubulcus ibis*		R
	Accipitridae			
155.	Crested Serpent Eagle	*Spilornis cheela*	S/NRDB, II/CITES	S
156.	Black Eagle	*Ictinaetus malayensis*	II/CITES	R
157.	Mountain Hawk Eagle	*Spizaetus nipalensis*	S/NRDB, II/CITES,	R
158.	Black Kite	*Milvus migrans*	II/CITES	PM
159.	Besra	*Accipiter virgatus*	S/NRDB, II/CITES	R
160.	Oriental Honey Buzzard	*Pernis ptilorhyncus*		R
161.	Common Kestrel	*Falco tinnunculus*	II/CITES	PM