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AVIAN SPECIES DISTRIBUTION IN PINE FOREST AND URBAN HABITAT OF ALMORA, UTTARAKHAND, INDIA

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Abstract. An avian survey was carried out at Almora town and their adjacent forests, Almora district, Uttarakhand. During the April 2007 – May 2008 study period, we recorded 61 species of birds represented by 29 families. Turdidae and Corvidae were the most dominant families. 44.3% and 37.7% species were exclusive in forest and urban habitat, 18.0% species used both habitats. Bird species diversity was the highest in the forest habitat as compare to urbanized habitat and the beta diversity value was not high while, most of the forest species were overlapped with the urban habitat. Kaleej Pheasant was the most frequent in forest habitat.

Key words: fauna, diversity, number, habitat.

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Видовое разнообразие птиц в сосновом лесу и городских биотопах в Алморе, Уттараханд, Индия. - К.К. Джоши, Д. Бхатт. - Беркут. 18 (1-2). 2009. - Исследования проводились в апреле 2007 – мае 2008 гг. Всего был учтен 61 вид птиц из 29 семейств. Доминировали дроздовые и врановые. 44,3% и 37,7% видов встречались соответственно только в лесу или в городе, 18,0% – были общими. Видовое разнообразие было выше в лесу, наиболее многочисленная птица – черная лофура.

Introduction

The Western Himalayan region Uttarakhand Hills is covered with 65% of forest land and supports a good habitat for bird diversity. The Himalaya is well recognized for its biological diversity and its ecological, hydrological, socio-cultural and aesthetical values. The Western Himalaya is an important area of regional endemism and has been designated by BirdLife International as Endemic Bird Area (EBS 128). Many ornithologists have been published the base line information on the avifauna of Western Himalaya: Ali, Ripley (1997), Gaston (1994), Lamba (1987), Tak, Kumar (1987), Tak, Sati (1994), Satyakumar (2003), Bhatt, Joshi (in press). Comparative studies on composition of bird communities at different habitats, including urbanized area, may improve our knowledge about the general pattern and processes that characterize bird species and communities.

It is well known that composition and long term persistence of many avian populations depend upon precise habitat requirements, abundance and dispersal strategies by individual species while urbanization has been shown to produce fundamental changes in ecosystem structure and populations. These changes include vegetation removal, construction of roads, buildings, bridges, channels and increased human presence.

The study site Almora is well known for hill station. It is situated at 1646 m a.s.l. (29° 36′ N, 79° 30′ E) in montane slopes and surrounded with Chir Pine (*Pinus roxburghii*) and deciduous forest. Besides these some timber trees like Rainj (*Quercus lanuginose*), Banj (*Q. inacana*) and the conifer *Cupressus torulosa*, *Cedrus deodarus* provide a unique habitat for the bird species in this area. Although due to the construction and development activities forest habitats are reducing in Almora.

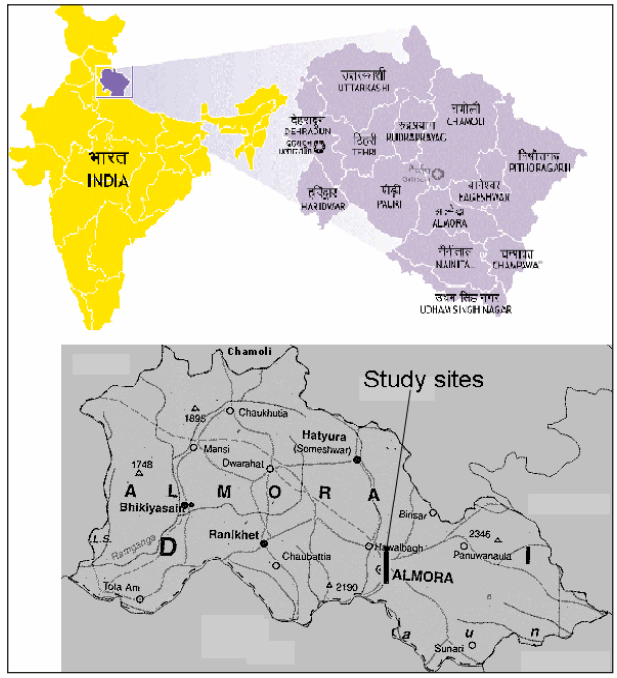
The present study introduces the bird diversity in forest and urban habitat as well as highlights the ecology importance of Almora forest so that could be conserve the forest habitat of Almora which is disturbing due to man made activities.

Material and Methods

The present study was carried out in some parts of forest (Shalidhar, Kasardevi and

Chetai) and urban habitats (Kosi market, NDT and Almora market) of Almora district (Fig.). The climate is influenced by monsoon pattern of rainfall. Forest habitat is locate at 1200–1300 m a.s.l. This area is dominated with *Pinus roxburghii*, *Qurecus* species and urban habitat about 15 km far from the forest area is situate at 1500–1600 m a.s.l. and cover with Deodar (*Cedrus deodarus*).

The climatic condition of this area is influenced by lofty mountain and the alternating monsoons. The temperature of Almora generally decreases with elevation, the temperature range varies between min 2 ºC and max 30 ºC. The annual average rainfall of the study site ranges from 150–250 cm. Field studies were conducted during April 2007 to May 2008 using field binoculars (7 x 50). Line-transect counts (Verner, 1985) method was used for measuring bird abundance. The time of sampling was between 7^{30} and 10^{30} a.m. and 5^{00} and 8^{00} a.m. during winter and summer respectively. Total 180 transects were sampled in both the habitats. Sampling was avoided during rainy days. The identification of birds in the field and feeding guild structure was classified on the basis of field observation and based on secondary literature (Grimmett et al., 1998). Species can be categorized as rare depending on the criteria used to define rarity. Species those had less than ten observations per sighting were categorized as rare. The avian species diversity estimated with the using of Shannon's index, species similarity and dissimilarity between habitats were analyzed Jacard's similarity index and Whittaker's beta diversity methods respectively (Maguran, 1988).



Study area. Район исследований.

Results

A total 61 species belonging to 29 families were observed (Table 1) during survey in forest and their adjoining area (urban habitat). Turdidae and Corvidae were the most dominant families with 6 species. 44.3% and 37.7% species were exclusive in forest and urban habitat, 18.0% (11) species used both habitats.

The species diversity and richness were greater in forest than in the urbanized habitat, besides it there was no great species variation (Beta diversity) recorded between forest and urbanized habitats (Table 2). There were 11 seasonal visitors. 5 summer (*Terpsiphone paradise, Eumyias thalassina, Clamator jacobinus, Nectarinia asiatica, Melophus lathami*) and 6 winter (*Certhia himalayana, Motacilla alba, Buteo buteo, Oriolus oriolus, Hirundo rustica, Pericrocotus ethologus*) visitors were recorded during the study. The Red-billed Blue Magpie (*Urocissa erythrorhyncha*) and House Sparrow (*Passer domesticus*) were most frequent in Almora forest and urbanized habitat respectively (Tables 3–4).

The feeding guilds were analyzed and we found that insectivore guild was dominant in

Table 1

Checklist of the avian species found in forest and urban habitats of Almora
Список видов птиц, найденных в лесу и городских биотопах Алморы

Family	No	Species	Status	Feeding guild
Accipitridae	1	*Gyps himalayensis*	R/AM	Cr
	2	*Neophron percnopterus*	R	Cr
	3	**Accipiter virgatus*	R	Cr
	4	**Buteo buteo*	WV	Cr
	5	*Milvus migrans*	R	Cr
Phasianidae	6	*Lophura leucomelanos*	R/AM	In
	7	*Francolinus francolinus*	R	In
Charadriidae	8	**Vanellus indicus*	R/AM	In
Columbidae	9	*Columba livia*	R	Gr
	10	**Streptopelia decaocto*	R/AM	Gr
	11	*S. chinensis*	R/AM	Gr
	12	*S. orientalis*	R/WV	Gr
Psittacidae	13	*Psittacula cyanocephala*	R	Fr
	14	*P. krameri*	R	Fr
Cuculidae	15	*Eudynamys scolopacea*	R	Om
	16	**Clamator jacobinus*	SV	Om
Strigidae	17	**Athene brama*	R	Cr
Meropidae	18	*Merops orientalis*	R/AM	In
Upupidae	19	*Upupa epops*	R/AM	In
Capitonidae	20	*Megalaima virens*	R/AM	Fr
Picidae	21	**Picus chlorolophus*	R	In
	22	*P. squamatus*	R	In
Hirundinidae	23	*Hirundo rustica*	WV	In
Motacillidae	24	*Motacilla alba*	WV	In
Campephagidae	25	*Hemipus picatus*	R/AM	In
	26	*Pericrocotus ethologus*	WV	In
Pycnonotidae	27	*Hypsipetes leucocephalus*	R	Gr
	28	*Pycnonotus leucogenys*	R	Gr
	29	*P. cafer*	R	Gr
Turdidae	30	*Saxicola torquata*	R/AM	In
	31	*S. caprata*	R/AM	In
	32	*Copsychus saularis*	R	In
	33	*Chaimarrornis leucocephalus*	R	In
	34	**Enicurus immaculatus*	R	In
	35	*E. maculatus*	R/AM	In
Timaliidae	36	*Turdoides striatus*	R	In
	37	*Garrulax lineatus*	R	In
Paridae	43	*Parus monticolus*	R	In
	44	*P. major*	R	In

End of the Table 1

Muscicapidae	38	*Terpsiphone paradisi*	SV	In
	39	**Niltava macgrigoriae*	R	In
	40	*Eumyias thalassina*	SV	In
	41	*Rhipidura albicollis*	R/AM	In
	42	*Myophonus caeruleus*	R/AM	In
Certhiidae	45	*Certhia himalayana*	WV	In
Zosteropidae	46	*Zosterops palpebrosus*	R	In
Emberizidae	47	**Melophus lathami*	SV	In
Nectariniidae	48	*Nectarinia asiatica*	SV	Na
Estrildidae	49	*Lonchura punctulata*	R/AM	Gr
Ploceidae	50	*Passer rutilans*	R/AM	Gr
	51	*P. domesticus*	R	Gr
Sturnidae	52	*Acridotheres tristis*	R	Om
	53	*A. fuscus*	R	Om
Oriolidae	54	**Oriolus oriolus*	WV	Fr
Dicruridae	55	*Dicrurus macrocerus*	R	In
Corvidae	56	*Corvus corax*	R/AM	Om
	57	*C. macrorhynchos*	R/AM	Om
	58	*C. splendens*	R/AM	Om
	59	*Urocissa erythrorhyncha*	R/AM	Om
	60	*Dendrocitta vagabunda*	R	Om
	61	*D. formosa*	R/AM	Om

Abbreviations: R – residential, WV – winter visitor, SV – summer visitor, AM – altitudinal migrant, Cr – carnivore, Fr – frugivore, In – insectivore, Gr – granivore, Om – omnivore, Na – nectarivore, * – rare species (n < 10).

both the habitats followed by omnivore, granivore, carnivore and frugivore (Table 5). However, these feeding guild observations show the maximum insectivore species (55.9%) were present in urban compare to forest habitat (42.1%) this may be due to the rich availability of insects in urban habitat. House Sparrow was dominating in urban habitat of study areas. Indicating it's good abundance in the Almora hill area though at other places the population of this species is getting declined.

In the present study birds census records indicates that 7 species in forest (viz. Black-backed Forktail (*Enicurus immaculatus*), Eurasian Golden Oriole (*Oriolus oriolus*), Lesser Yellow Nape (*Picus chlorolophus*), Pied Cuckoo (*Clamator jacobinus*), Common Buzzard (*Buteo buteo*), Sparrowhawk (*Accipiter virgatus*), Spotted Owlet (*Athene brama*)) and 4 species (viz. Eurasian Collared Dove (*Streptopelia decaocto*), Red Wattled Lapwing (*Vanellus indicus*), Small Niltava (*Niltava macgrigoriae*), Crested Bunting (*Melophus lathami*)) in urban was sighted below 5 numbers of individuals and categorized as rare of that area (Table 5). However, during this study exciting finding was recorded the Kaleej Pheasant (*Lophura leucomelanus*) and Black Partridge (*Francolinus francolinus*) were most sighted in forest habitat.

Discussion

Results indicate that forest habitat has high number of unique species as to urbanized habitat. It shows that these are its own

Table 2

Diversity indices of species in forest and urbanized habitats
Индексы разнообразия видов в лесу и городских биотопах

	Forest habitat	Urban habitat
Diversity	3.00	2.51
Richness	4.06	3.34
Evenness	0.91	0.80
Beta diversity	0.21	
Similarity	0.62	
Summer visitors	5	
Winter visitors	6	

species (Thiolly, Meyburg, 1988). The highest diversity index value was recorded in forest as compare to urbanized habitat. Most of the forest avian species were overlapped with urban habitat which indicates that the forest species moves to urban habitat for feeding. The variation in bird community consistent with the distribution of food resources was reported by Lefebvre and Poulin (1997). However, few studies (Cody, 1985; Morrison, 1992; Block, Brennan, 1993) have mentioned that the distribution and abundance of many bird species are determined by the configuration and composition of the vegetation. Forest habitat of the study site provides the rich sources of food and shelter as well as it is less disturb by the human activities thus the species diversity was greatest here. Urban habitat shows the lowest avian diversity value due to it scattered vegetation and noise disturbance. The highest richness of insectivore guild shows that high abundance of insects in urban habitat and their availability is constant in all seasons. High richness of avian species and dominance of Pheasants in forest indicate that it provides a good shelter and food for birds. During this study we observed that the construction work (i.e. road cutting, building) was peak in Almora city and adjoining area. Forest habitat needs the conservation for saving the species diversity.

Table 3

Dominant species in forest habitat
Доминирующие виды в лесу

Species	Frequency, %	Relative frequency %
Urocissa erythrorhyncha	66.7	17.0
Zosterops palpebrosus	66.7	17.0
Acridotheres fuscus	58.3	14.9
Corvus macrorhynchos	50.0	12.8
Hypsipetes leucocephalus	41.7	10.6

Table 4

Dominant species in urbanized habitats
Доминирующие виды в городских биотопах

Species	Frequency, %	Relative frequency, %
Passer domesticus	100.0	23.4
Acridotheres tristis	95.0	22.2
Pycnonotus cafer	91.7	21.4
Garrulax lineatus	75.0	17.5
Corvus splendens	66.7	15.6

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Table 5

Feeding guild of species in forest and urban habitat
Кормовые гильдии видов в лесу и городских биотопах

Feeding guild	Forest habitat		Urban habitat	
	n	%	n	%
Insectivorous	16	42.1	19	55.9
Omnivorous	9	23.7	5	14.8
Carnivorous	5	13.2	1	2.9
Granivorous	2	5.3	4	11.8
Frugivorous	6	15.8	4	11.8
Nectarivorous	–	–	1	2.9
Total	38	100	34	100

Матвиенко М.Е. Очерки распространения и экологии птиц Сумской области (60-е годы XX ст.). Сумы: Университетская книга, 2009. 210 с.

Как говорил булгаковский Воланд: «Рукописи не горят». К счастью, это относится и к научным трудам. Работа известного сумского зоолога М.Е. Матвиенко была написана еще 40 лет назад, но в свое время так и не была напечатана. Радует, что его коллеги не дали пропасть собранному автором значительному материалу, и книга все же увидела свет.

Хотя со времени написания рукописи прошли уже десятки лет, но книга не потеряла актуальности. Она представляет собой «временной срез» состояния орнитофауны Сумской области в 1960-е гг. Благодаря приведенным данным можно оценить произошедшие изменения, проанализировать их причины, спрогнозировать дальнейшие тенденции.

Книга состоит из эколого-фаунистических очерков по 237 видам птиц. Передует им предисловие научного редактора издания (Н.П. Кныша) и введение самого автора. Во введении М.Е. Матвиенко вкратце описывает историю изучения птиц на Сумщине и методику своих исследований. Для многих видов в очерках приводятся важные сведения по распространению, экологии, численности, срокам размножения и миграции, питанию. В конце книги помещен список основных научных публикаций М.Е. Матвиенко.

В.Н. Грищенко