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RESEARCH ARTICLE

IMPACT OF URBANIZATION ON THE BIRDS HABITAT

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ABSTRACT

Urbanization affects the heterogeneity of the landscape and consequently the distribution, abundance and resources upon which birds depend. Birds are sensitive indicators of the cumulative effects of urbanization and provide a powerful signal of changes in landscape configuration, composition and function. The study was done through point count method around the study area (Jaipur city). The intent of this study was to examine the effects of urbanization on the avian habitat preference by assessing (1)the structures used by the birds for nesting,(2)the nesting/roosting site preference of different species and (3)the density and richness of communities. The study revealed that habitat used by urban birds appeared to be strongly influenced by the structure of habitat, food availability predators and parasites. The study of Jaipur urban birds showed that out of the total 167 species frequenting the urban area only few species were found to utilize the man made structure for nesting purpose. Apparently other species have adapted themselves to human environment for various other activities such as feeding and resting.

INTRODUCTION

Birds provide a powerful signal of changes in landscape configuration, composition and function. They are sensitive indicators of the cumulative effects of urbanization. Urbanization affects birds both directly and indirectly (Marzluff 1997). It directly changes ecosystem processes, habitat and food supply. Indirectly, it affects bird's predators, competitors and diseases. These lead to quite significant changes in bird's population biology and to resulting changes in bird communities. Urbanized habitats typically support larger (by biomass) and sometimes richer (more species), or less evenly distributed avian communities, dominated by a few very abundant species (Pitelka, 1942; Emlen, 1974; DeGraf and Wentworth, 1981; Rosenberg *et al.,* 1987; Mills *et al.,* 1989). Urbanization alters normal selective pressures so that the composition of urban avian communities differs from those found in native environments (Beissinger and Osborne 1982; Rosenberg *et al.,* 1987 Mills *et al.,* 1989; Blair 1996; Bock *et al.,* 1997).

STUDY AREA

Jaipur, the capital city of Rajasthan lies between 26° 23' N and 27° 51' N latitude and 74° 55' E and 76° 50' longitude, amidst Aravalli hill ranges. Although the area is semiarid, the flora of Jaipur appears to be diverse and rich. Winter season is from December to February and is followed by hot season from March to June. One of the most characteristic features of the climate of Jaipur area, as in the other semiarid regions, is the great extreme of temperature. The winter is quite cold. On the other hand, the heat during the summer is intense and scorching. The mean maximum temperature recorded in the month of May (40.10°C) while minimum in the month of January was (7.9°C).

MATERIALS AND METHODS

To observe the pattern of bird habitat utilization in Jaipur city, study area was divided into seven categories consisting of 30 sites for daily observation purposes. Different census stations were marked in order to record the avian diversity and their habitat utilization pattern and the estimation of bird density was done through point count method (Bibby *et al*., 1988) and visual observation method. For identification and field diagnosis of birds, colorful plates of Ali and Ripley (1968 - 1983), Ali (1996), Grimmett *et al.* (1998) and Grewal *et al.* (2002) have proved quite helpful. The nomenclature followed in the present work is in accordance with those given in "A pictorial guide to the birds of the Indian Subcontinent" authored by Ali and Ripley (1983).

RESULTS AND DISCUSSION

During the course of the present investigation, 167 species of birds belonging to 44 families were reported from Jaipur city.

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The high number of bird species in city supports the statement of Burton (1977), who opined that Indian cities harbour a large number of birds due to availability of both the natural and artificial habitats like buildings, gardens, parks etc. within the urban habitats. Study of different gradient habitats, less developed to highly developed areas, revealed that the bird species that were found in less developed areas were sensitive to development and usually avoid disturbed habitats, whereas the species that were found in urban areas were usually those who have adapted themselves to this changed environment and pursue various activities like nesting, feeding, perching, roosting etc.

Habitat utilization pattern

Nesting

Urban habitat with a mosaic of vegetated and non-vegetated features provides various nesting sites to many bird species. Safety of nest and young ones are prime factor in selection of nesting sites. Edges of tile roofs, ledges under roofs, and dense vines growing on walls provide important nesting cover for several species. Isolated ornamental trees, shade trees and shrubs, favour species that can make use of lower nesting sites and also increases the number of tree nesters and cavity nesters (Real and Blair, 2005 and Emlen, 1974). In addition, the introduction of novel nesting locations like chimneys, dryer vents, rain gutters and other man-made structures, allow species with unique or flexible nesting preferences such as myna, house sparrows, blue rock pigeons to inhabit highly urban sites. Many nests of pigeons were found on multi-storeyed buildings, window ledges, electricity board, electricity cable, notice board, and shelve. However, no nest was found on trees during the study period. Doves were found to be using both trees and man-made structures such as tube-lights for nesting. House sparrows were seen making nests on ceiling fans, tube-lights, rain gutters, window ledges, electricity board, dryer vents etc. Lapwing nest was found on the roof of buildings, which was found suitable by lapwing for nesting purposes, probably in terms of protection from mammals like stray dogs and cats and other predators. Many nests of pied myna and common myna were found on electricity poles. Transparent polythenes were also used by them as nesting materials. Nests of brahminy myna was observed in electricity board, holes in walls, tree holes , etc. in the study area. Night lamps in the gardens and roadside lights were also used by myna and house sparrows for nesting. Kite and crow nests were found on tall towers and tall trees; high nesting may provide better predator protection and avoid competition from low nesting species.

Roseringed parakeet nest was also seen in the excavated tree. Brown rock chat usually nests in caverns in houses to avoid predator and human disturbance. House swift was observed to utilize the building for nesting purposes. Nests of house swift were found attached to the underside of roof of narrow corridors and also in domes. Hence many man-made structures like, electricity boards, crevices in wall, caverns, tree trunk cavity, rain gutters in houses and flyovers, provide a suitable nesting site to the hole/ cavity nesters like brahminy myna, Roseringed parakeet, woodpeckers, coppersmith barbet etc. in the city. This is in the agreement with the findings of Geis (1974), and Beissinger and Osborne (1982).

Feeding

Ornamental trees, often fruit bearers, provided differential sources of food for omnivorous and seed eating birds. Some of the exotic and introduced trees also support some species of insects apart from native trees, which ultimately increase the number of insectivores in urban areas. Insectivores contributed 10.17% of total birds observed. The highest contribution was of omnivorous 52.69% and minimum were of frugivores (1.19%). Whereas, carnivores, granivores and herbivores contributed 31.13%, 2.99% and 1.79% respectively. The high number of omnivores and granivores may be due to the introduction of weedy lawns and home feeders which enhance the seed supplies in the urban habitat. Out of total of sites selected, 18 (60%) sites were dominated by omnivorous species and remaining 12 (40%) were dominated by granivorous species. Considerable food is generally available around many poorly covered garbage and trash containers in each city block. Waste vegetables from crowded markets, leftovers near railway stations, bus stands, houses were also taken by few omnivorous birds (like myna, crow, and sparrow) and contributed towards increase in their number. Temple habitat, with the traditional good will of Indian people was also found to support anappreciable number of granivorous bird species (pigeons and doves) (Plate 7A).

Perching

Special features and artifacts of human origin contribute significantly to the physiognomy and diversity of the urban habitat. House tops and particularly their superstructures such as air-conditioner units and television aerials provide attractive song and resting perches. Telephone poles and wires provide abundant and well distributed perches at an elevation from 10 to 40 ft. While fence tops provide similar perches at lower levels. It was also found that the increase in flycatchers may be due to the introduction of many well dispersed high lookout perches in the city in the form of telephone lines and tall trees, which help flycatchers to catch flying insects. Emlen (1974) also stated the similar phenomena. These manmade structures were also used by crows during pre-roosting aggregations. Hoardings in the city were also seen to be used by kites and pigeons for perching. Pigeons, mynas, crows, bee eaters and many other birds used electric wires for perching because it may provide a better sighting and predator protection. In case of bee eaters it is more helpful to hawk insects.

Roosting

Tall trees some buildings with its specific architecture in the study area provide good roosting sites to birds. Albert Hall building supports thousand of pigeons, and building is usually covered with their droppings. Many other buildings in city also provide good roosting sites for pigeons. The selection of buildings by pigeons may be because these structures provide better predator protection or enhanced foraging efficiency. Electricity wires were also used by pigeons in some areas for roosting purposes. Pigeons were also seen roosting on hoardings. Crows and kites used tall trees for roosting, while

bank mynas were found using hoardings, rain gutter in flyovers apart from trees for roosting. Tree canopy was preferably used by all species of myna for roosting purposes. Rosy pastor was seen roosting on trees near Amanisha-Ka-Nala, in winters. Cattle egrets were also seen roosting on the top of the tall trees near water body.

Summary

The new synthetic habitats lie open to invasion and colonization by any bird that can reach them, utilize their peculiar constellation of resources and survive their special hazards. Birds which are common in urban environment have adapted themselves to this changed environment in various ways and are known as "urban adaptive generalists. These birds are those which are less affected by toxic substances flowing through cities, better able to adapt to artificial light, to communicate over the noise of traffic and automation, to breed successfully on human built structure and to rebound after perpetual decimations. Individual species however, display differing responses to urbanization. Few birds reach peak densities in urban or suburban settings, while others reach peak densities at natural sites. The high abundance of these species may be because these species are better able to exploit the resources provided and can replace (or out-compete) other species. One more reason for the high number of these birds may be the increase in structural diversity (like - buildings, poles, electricity wires and ornamental vegetation etc.) of the habitat which provides more variety of sites for various activities, such as perching, roosting, nesting etc. Thus development intensity or urbanization shifts urban community structure from development sensitive specialists to urban adaptive generalist (Nilon *et al*., 1994).

Hence in present study, few species of birds like blue rock pigeon, house sparrow, mynas, house crow, house swift, brown rock chat, black kite, were found to exploit the urban environment and its resources and can be classed as "urban exploiters". Other birds like purple sunbird, rose ringed parakeet, Indian robin, coppersmith barbet, baya, babblers, red-wattled lapwing, koel, crow phaesant, spotted owlet, white breasted kingfisher, black drongo, green bee eater, redvented bulbul, woodpeckers, silverbill, hoopoe, Indian peafowl, white eye, tailor bird etc. were found as "sub-urban adaptable". Lastly birds like desert wheater, Indian pitta, nightjar, paradise flycatcher, honey buzzard, golden oriole, blossom headed parakeet, pied crested cuckoo, barn owl, common iora etc. were usually found to avoid urban setting (rarely seen in urban areas). These are categorized as "urban avoiders".

It was observed that urban habitat with various structures provide suitable nesting, feeding, perching and roosting sites to various species of urban birds. The introduction of novel nesting locations like chimmneys, dryer vents, rain gutters and other man-made structures, allow species with unique or flexible nesting preference such as myna, house sparrows, blue rock pigeons to inhabit highly urban sites. Other structures such as window ledges, electricity boards, notice boards, shelves, tube-lights, transformers, cavities in walls, caverns in houses etc. were also found to provide good nesting sites to few bird species. Housetops and particularly their superstructures such as air-conditioner units and television aerials provide attractive song and resting perches. Hoardings, electric wires, tall trees were also preferred by few bird species for perching because these structures were found to provide a better sight and help in predator protection. In case of bee eater it is more helpful to hawk insects. Tall trees and some buildings with its specific architecture in the study area provide good roosting sites to birds.

REFERENCES

Ali, S. 1996. The Book of Indian Birds (12th and enlarged centenary edition). *J. Bomb. Nat. Hist. Soc.,* Oxford Univ. Press, New Delhi.

Ali, S. and Ripley, S. D. 1968-74. The Handbook of Birds of India and Pakistan. Ten volumes. *Oxford University Press,* Bombay.

Ali, S. and Ripley, S. D. 1983. A Pictorial Guide to the Birds of the Indian Subcontinent. BNHS, Oxford Uni. Press, Bombay.

Beissinger, S. R. and Osborne, D. R. 1982. Effects of urbanization on avian community organization. *Condor,* 84: 75–83.

Bibby, C., Jones M. and Marsden S. 1988: Expedition field techniques bird surveys. Published by Expedition Advisory Center, Royal Geographic Society. London.

Blair, R. B. 1996. Land use and avian species diversity along an urban gradient. *Ecological Applications,* 6:506–519.

Bock, C. E. and Jones, Z. F. 2004. Avian habitat evaluation: should counting birds count? *Frontiers in Ecology and the Environment,* 2(8), 403–410

Burton, J. A. 1977. Nature in the city in worlds apart. Vol. II, Double day and Co., New York.

DeGraaf, R. M. and Wentworth, J. M. 1981. Urban bird communities and habitats in New England. Pages 396-412 *in* North American Wildlife Conference, Washington, DC.

Emlen, J. T. 1974. An urban bird community in Tucson, Arizona: derivation, structure, regulation. *Condor,* 74: 184-197.

Geis, A. D. 1974. Effects of urbanization and type of urban development on bird populations, p. 97-105. In J.H. Noyes and D.R. Propulske (eds.), Wildlife in an urbanizing environment. Univ. Massachusetts, Amherst.

Grewal, B., Harvey, V. and P fister, O. 2002.A Photographic guide to the Birds of India. Periplus Edition (H K) Ltd. Singapore.

Grimmett, R., Inskipp, C. and Inskipp. T. 1998. Birds of the Indian Subcontinent. Oxford Univ. Press, Delhi.

Marzluff, J. M. 1997. Effects of urbanization and recreation on songbirds. Pages 89-103 in W.M. Block and D.M. Block, eds. Songbird ecology in South Western Ponderosa Pine Forests: a literature review. Central Technical Report RM - GTR-292. Fort Collins, CO.

Mills, G. S., Dunning, J. B. Jr. and Bates, J. M. 1989. Effects of urbanization on breeding bird community structure in southwestern desert habitats. *Condor,* 91: 416–428.

Nilon, C. H., Long, C. N. and Zipperer, W. C. 1994. Effects of wild land development on forest bird communities. *Landscape and Urban Planning,* 32: 81-92.

Pitelka, F. A. 1942. High population of breeding birds within an artificial habitat. *Condor,* 44: 172-174.

Reale, J. A. and Blair, R. B. 2005. Nesting success and life history attributes of bird communities along an urbanization gradient. *Urban Habitats,* 3(1): 1-24.

Rosenberg, K. V., Terrill, S. B. and Rosenberg, G. H. 1987. Value of suburban habitats to desert riparian birds. *Wilson Bulletin,* 99: 642–654.

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