SUMMARY

Urbanization produces large scale extensions of once continuous natural habitats, causing its intense fragmentation. The increased urbanization usually leads to an increase in the avian biomass with reduction in species richness. This successive increase is reflected as increase in the population of certain species as urban settings are free from persecution and provide adequate food supplies As urban settlements encroach natural habitats, it is clear that their impacts need to be mitigated, and their potential for conservation better understood and exploited. Numerous studies on avifauna have been carried out in urban landscapes.

Black Kite (*Milvus migans govinda)* is a resident urban raptor of Indian sub continent that occurs in huge numbers in Metro cities. As there is lack of information about its ecology in urban area, an attempt is made to document habits of this umbrella species in an urban landscape. The first part of study includes Ecology while second part of study includes essential and toxic elements from different tissue of *Milvus migrans govinda.*

POPULATION AND ROOSTING ECOLOGY:

In Vadodara maximum population of Black Kites was noted during Monsoon (July-September) indicating arrival of migratory kites from the southern parts of India. Sudden increase in number of kites was noted 3 to

4 days prior to the arrival of south-west monsoon of Indian subcontinent. The number reaches to peak by month of August and/or September before retreating monsoon sets in the area. The fluctuating populations of Black Kites showed positive relationship with environmental variables like temperature in all seasons but with humidity only in monsoon. During study period rainfall was highly significantly correlated with population of kites due to arrival of migratory population from southern regions of India which immigrate to these comparatively drier parts of semiarid zone where Vadodara is located. The understanding of fluctuating population behaviour with environmental variables might be useful pertaining to the management and conservation of such species in an urban landscape. When roosting time is considered highly significant positive correlation is noted with humidity. While, highly significant negative correlation with temperature. On hot summer days Kites may be seen soaring in the sky till late evening after sunset and descending to roost at the urban concrete starts cooling down, during monsoon availability of natural prey like insects satisfy their energetic needs and rain as well as clouds probably forces them to arrive at roost earlier. It was observed that humidity was positively expressed with arrival time at which 50% of the Black Kites arrived. Most of the Black Kites arrived earlier at roost sites when relative humidity was higher.

In Vadodara, Black Kites roosting prefer on aggregations on tall trees with dense canopy cover. Sunset time, temperature and humidity are significantly correlated with the arrival time of the Black Kite to their roosting aggregation, while temperature had a very little effect on this daily activity. Further, the Black Kites prefer certain features of trees while selecting their roosts. These may be tree height, shape and canopy cover.

NESTING ECOLOGY:

The nest site selection is important determinant of the population dynamics of birds. In the present study it is noted that the Black Kites mainly prefers Neem trees for nesting. The reason may be the availability of these trees with suitable height and canopy preferred by these raptors. Neem- *Azadiracta indiaca* is one of the most common tree in the area. Among other trees Maha Neem- *Alianthus exelsa* with almost similar canopy covers and height were preferred. These species of tree also provides number of crotches to hold the nest at the proper locations. The dense cover of the canopy provides sustained protection by minimizing the direct heat loss to the open sky and reduces the thermal stress to vulnerable young and also provides hide from the predators. Moreover, a well covered nest does not require wing shading provided by parents to their chicks, which considerably reduces energy loss by the parents. In

addition, higher nest elevation provide easy access to leave and land directly on the nest.

Beside the characteristics of the tree and nest vicinity, consideration of the foraging sites is also equally important. The majority of nests were found nearer to either garbage dumps where plenty of food is available or near poultry or mutton shops where skin is thrown away. Hence, availability of food is important factor affecting nest site selection. Food and water are the basic requirement for any individuals. In Black kites, their nests are nearer to waterbodies too.

FEEDING ECOLOGY:

In the terrestrial ecosystems predators -the raptor among the birds, play the apex role. Occupying a position at highest tropic level they play important role by regulating prey species. Black Kite is a diurnal bird of prey mainly feeding on the insect and small sized amphibians as well as other smaller vertebrates. As food is main component for survival of a species, food preference studies are also conducted for Black Kites. Regurgitated pellets from all the study sites mainly contained feather of poultry birds. This shows that the poultry leftover were the most preferred food. The data is supported by the facts that out of three, two study sites are in close vicinity to poultry farms and/or dump yard where poultry leftovers are easily available. In addition parts of insect exoskeleton and

amphibian bones are also found in the pellets but at very low levels. Heavy dependence of the Black Kites on the poultry leftovers shows its easy availability and widespread presence in the urban area. The proportion of insects diet is higher during monsoon, especially in the pellets collected from Sayajibaug which has rich undisturbed natural habitat supporting variety of insects while other two areas have comparatively more concrete structures and low insect diversity. Hence, it may be said that Black Kite has adapted to urban, environment and the easy food supply that has help the population thrive in the region.

ESSENTIAL AND TOXIC ELEMENTS:

Birds use different sources of food and water in a relatively large area and thus the level of trace elements in bird's organs and feathers may reveal the levels of toxic elements in their entire home range. Tissues of raptors are known to be potentially appropriate biomonitors for environmental heavy metal contamination. Hence, the other aspect of current study was preliminary assessment of toxic (Cd, Hg, Ni, Pb and Cr) and essential (Zn, Cu and Co) elements in the various tissues like liver, kidney, muscles and feathers of *Milvus migrans govinda*. Black Kites generally exhibited low to moderate concentrations of these elements in tissues. Based on these results, metal pollution does not appear to be an immediate risk to these birds. Black Kites may be particularly well-

adapted to survive in urban areas as they mainly feed on poultry leftover where possibility of heavy metal contamination is expected to be rare. In the present study it is revealed that urbanization has very little impact on accumulation of heavy metals in Black Kite as it mainly feeds on poultry leftover and prefers soaring high in the sky during evening hours as its energy requirement are fulfilled and hence the median concentrations of these metals were lower in tissue of Black kite (*M. m. govinda*) in Central Gujarat.