GENERAL CONSIDERATION

The urban landscapes asses a broad spectrum of variable environments ranging from patches of land to highly modified streetscapes that house a large proportion (~ 50%) of the world's human population. This proportion is increasing rapidly, particularly in the developing world (World Resources Institute, 1996) and by 2030 no space is expected to be available in cities. Such processes of urbanization promote extensive changes in the landscape, especially when urban sprawl produces large scale extensions of once continuous natural habitats, causing its intense fragmentation. Large proportions of birds are known to adjust to such changes. Even though patterns of avian responses to urbanization are emerging, most of the studies have been carried out in the temperate regions.

In the present study, we have made an attempt to understand the ecology of a raptor- Black Kite *(Milvus migrans govinda),* a species well adapted to urban ecosystem in the metropolitan cities of India *i.e.* including Vadodara, Gujarat, along with assessment of environmental toxicant in various tissues of this species.

Vadodara is located at 22.30°N 73.19°E in western India at an elevation of 39 metres. The city sits on the banks of the River Vishwamitri, in central Gujarat. Divided into two aspects: behavioural and laboratory

study, Behavioural part includes Population fluctuations, Roosting, Nesting and Feeding ecology while, laboratory study includes quantification of trace elements from various tissue of Black kite.

Three roosting sites observed during study period namely Sayajibaug, Railway Station and Bhutdizapa all together support hundreds of Black kites with seasonal fluctuations in number above the noise of daily variability. Number increases during Monsoon due to arrival of migratory populations from southern parts of India.

Birds settle down at roosts sites during evening. Among the different environmental parameters like humidity, temperature and sunset time, the last one is most important to bring individuals back to the roost with temperature and humidity playing little effect. The roost sites selected are aggregations of trees either monospeciefic or multispcific. However, in the later only two species are used for roosting. For understanding the characteristics of roosts, tree species, its canopy cover, DBH, number of birds per tree, shape index *etc.* are counted at each roost sites. From this it can be said that Black kites select taller trees for roosting with greater canopy cover which will provide protection against wind, sunlight as well as predators.

Roosting time of Black kite is positively correlated with sunset time and temperature. Birds settled down at roosting place before sunset time around 8- 15 minutes earlier than sunset. Temperature and humidity

provide cles for arriving at roost earlier mainly during monsoon and winter.

Black kite (*Milvus migans govinda)* is one such resident urban raptor of Indian sub continent that occurs in huge numbers in Metro cities. During study hundreds of Black Kites migrated at each site arriving mostly between end of April and beginning of May, when a significant percentage of immature birds are observed. On the onset of pre monsoon the population size further increases with the arrival of migratory populations and temporary roosts are also formed. Population density is the major ecological characteristics pertaining to the ecosystem level energy use by the species.

During study period, when the migratory species mix with the resident species they show local movements from one roost to another roost. After some time some birds from that roost again come to the original roost. In Ahmedabad city these Black kites are observed roosting on the ground near dumping sites. Occasionally during full moon *M. m. govinda* shows some typical flying behaviour.

Reproduction is necessary process to produce a new generation of living individuals similar to themselves. In Birds, especially Raptors both male and female take part in nesting. For nest site selection tree height, canopy cover, and distance from feeding ground and water sources are important. Almost all observed nests of the Black Kites were found to be located on

the third sub branch of the trees. Black kite is a solitary breeder. Therefore, only one nest was found on a tree but occasionally two nests are found in Ahmedabad city. Kites do not use roosting trees for nesting. In study period majority of nests were observed on Neem tree. In city of Ahmedabad where tree density is low Kites build their nest on electrical poles and sometimes at the top of building too. Once a crow was also observed disturbing parents while feeding their young.

Feeding plays a critical role in biological adaptation. Food and water both are essential for parents as well as young once. On the basis of study on regurgitated pallets of Black Kites it is observed that in the urban areas poultry leftover is the main component of food with very less insects and small vertebrates. Consumption of later two items increases in monsoon when they emerge from their dormancy of summer after first rains. Kites may be seen foraging in the afternoon at dumping sites or in monsoon early in the morning on open grounds to catch emerging insects.

Environmental stressors like metal contamination, pesticides and pollutants are found in air and water in urban areas. Vehicular traffic, industrial exhaust and other pollutants are basic sources of toxic contamination including heavy metals and essential elements which disturb balanced in environmental biota. These pollutants also affect plants as well as animals. Among animals birds are considered as bio

indicators as changes in environment directly affect them. Raptors placed at the top of food chain are the umbrella species. Bioaccumulation of stressors in top predators can produce several adverse effects. As far as Black Kites in urban areas are concerned, as they mainly feed on poultry leftovers, biomagnifications of stressors in their body is not observed. However, on the bases of lessons learnt from *Gyps* species, it is necessary to monitor Black Kites which are thriving in urban areas and feeding on the leftover food produced by men for himself.

The present study provides baseline data for a species of raptor whose population is thriving in urban areas. Among raptors Vultures are considered highly sensitive towards the environmental change. Vultures are classified under Critically Endangered species in the world. By learning from vultures before anything happens to Black Kites care should be taken and planning its conservation and management are suggested.