



Population Estimation of Indian House Crow (*Corvus Splendens*) in Junagadh, Gujarat

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Abstract:

The Indian House Crow (*Corvus splendens*) population was estimated in Junagadh city of Gujarat. Direct roost count method was used to estimate population of Indian House Crow (*Corvus splendens*). Each site was visited four times in a month at late evening followed by next day early in the morning before sunrise. By carrying out the census of house crows, mean population of $2,127 \pm 57$ individuals at seven roost sites (five permanent and two temporary) were recorded in Junagadh from the month of January to December 2012. Count at each site was coming high from November to February (winter season) then decreased as the summer proceeds from March and again started increasing from August onwards. While performing ANOVA single factor, significant difference was found ($F = 7.435 > F_{crit}$, $0.01 > P$) comparing the count at each season. However within season of winter no significance change was observed in population while monsoon and summer showed significant alterations in population [$3.456 > F_{crit}$, $0.001 > P$ (monsoon) and $6.129 > F_{crit}$, $0.001 > P$ (summer)] at each site in Junagadh. The crow count was found to be decrease during breeding season at each site (Fig 1.3). Significant different was also found while comparing the count of breeding and non-breeding season ($F = 9.298 > F_{crit}$, $0.01 > P$).

Keywords: House Crow (*Corvus splendens*), Junagadh, Population

1. Introduction

The house crow (*Corvus splendens*) is indigenous to Indian sub-continent, including its neighboring countries like southern Iran, Myanmar, Nepal and Sri Lanka (Ali 2002, Ryall 2002, Mawangome 2011) where it is closely associated with people (Ali 2002) but, within 150 years they have been expanding their range primarily transferred by shipping throughout the Indian Ocean and beyond (Ryall 2002). However, the effects of house crows are so significant in more than 25 countries throughout Africa, Middle East and South East Asia where crows have been introduced (Ryall 1994, 1995, 2002), it is now regarded as one of the world's most invasive bird species (GISD 2010). The global population size has not been quantified, but the species is reported to be very abundant (Madge and Burn 1993). This greater ecological flexibility is due to its association with people (Ali 2002, Ryall 2002) because they are documented to be highly adaptive to the urban environment (Kurosawai *et al.* 2003, Ueta *et al.* 2003).

This is to the extent that no population is known to live independently of man (Nyari *et al.* 2006). Ward and Zahavi (1973) reported that the birds which feed together usually roost together. Therefore these birds can be count at roost sites locations nearest to their feeding sites (Gadgil and Ali 1975). Hence it was deliberated that instead counting the feeding flocks of house crows, direct counts obtained at roosts might give most reliable census result. This method was earlier applied by

Davis (1982), Sheshukumar (1984), Sykes (1983), Chavda (1988), Lathigara (1989) and Mehta (2010).

2. Methodology

Direct roost count method was used to estimate population of Indian House Crow (*Corvus splendens*) (Devis 1982). The study area was surveyed before to find the roosting sites by following the flocks of house crows in the evening and by listening to their calls. Since the house crow is firmly large size bird, it was easy to count individuals at roosts sites when the species aggregated as per its communal roosting habit.

Information from the local people was also gathered to search the location of roost sites. Presence of accumulated fecal droppings and regurgitated pellets beneath the crowns of roost trees were checked for indirect evidences of the presence of roosting site. The roosting crows were observed from the most advantageous point for instance the elevated spot in buildings or an open space. Survey was done without using optical equipment 50 m away from the roosts however 10X50 binocular was used whenever it was not possible to observe from the observation point.

Each site was visited four times in a month at late evening followed by next day early in the morning before sunrise. Observations began in the evening when crows started to return to the roost sites and continued until it was too dark to count them accurately (usually 30 m after sunset) and followed by next day morning at the same site. The numbers of crows that flew toward roost trees in the evening and going back to their routine in the morning were counted per minute. Each five minute interval, the number of roosting crows was considered as the total count for the arrivals minus the number of departure.

3. Result

By carrying out the census of house crows, mean population of $2,127 \pm 57$ individuals at seven roost sites (five permanent and two temporary) were recorded in Junagadh from the month of January to December 2012. Population of House crows was observed to fluctuate by the change of each month (Fig 1.1).

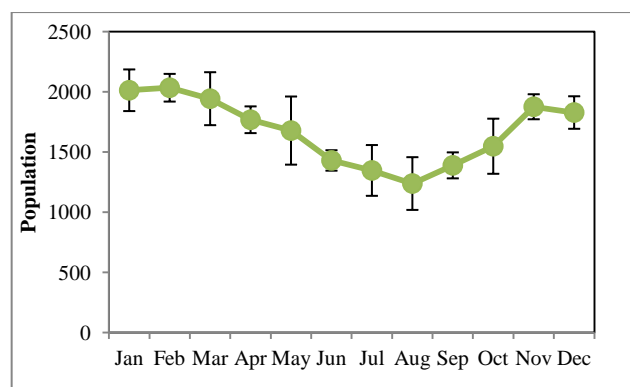


Figure 1.1 Month wise population trend of each year in Junagadh.

Highest population was recorded during November to February which reached to its maximum end in the month of January. Population started decreasing from the end of March and decreased up to July or August with the lowest count in the month of June (pick breeding time) and again increased from September on wards (Fig 1.2).

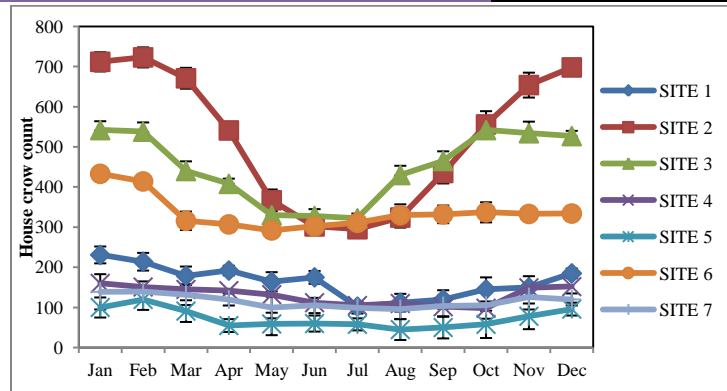


Figure 1.2 Month wise fluctuations in count of each roosting site of Junagadh

In order to know site wise fluctuations in population, monthly population at each site was compared. Count at each site was coming high from November to February (winter season) then decreased as the summer proceeds from March and again started increasing from August onwards (Fig 1.2).

Some of the roosting sites were stable throughout the year while most of the roosting sites were showing fluctuations as the change of each successive month. Roosting sites which had larger aggregations of more than 300 individuals showed extreme fluctuations such as Site 2, 3 and 6 (Fig 1.2).

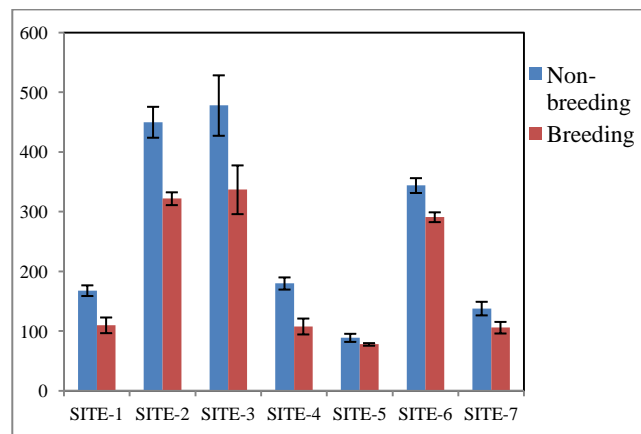


Figure 1.3 Comparison of breeding and non-breeding count at each site in Junagadh

The crow count was found to be decrease during breeding season at each site (Fig 1.3). Significant different was also found while comparing the count of breeding and non-breeding season ($F= 9.298 > F \text{ crit}, 0.01 > P$).

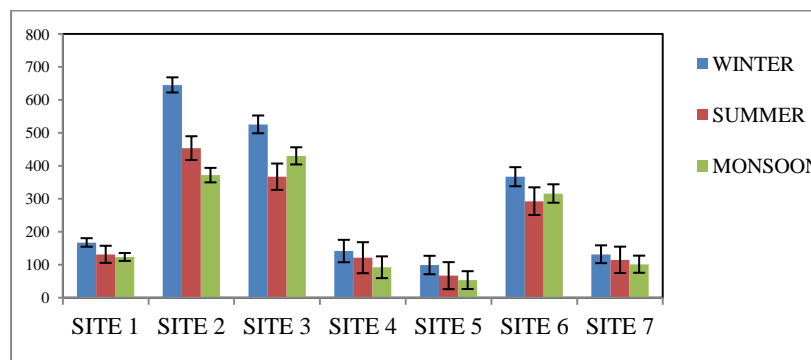


Figure 1.4 Seasonal changes in of each site in Junagadh.

By comparing the count of each season, maximum count was observed in winter. Count was decreased during summer followed by monsoon (Fig 1.4). While performing ANOVA single factor, significant difference was also found ($F= 7.435 > F \text{ crit}, 0.01>P$) comparing the count at each season.

Population fluctuation within one season was also checked. During winter no significance change was observed in population while monsoon and summer showed significant alterations in population [$3.456 > F \text{ crit}, 0.001 > P$ (monsoon) and $6.129 > F \text{ crit}, 0.001 > P$ (summer)] at each site in Junagadh.

4. Discussion

The fluctuations in the population size resulted primarily due to the dispersion and aggregation of house crow throughout the study period. The number of crows was supplemental during winter season and reduced in summer as well as monsoon seasons (breeding season).

5. Winter aggregations

Thermoregulation and safety are two reasons of larger aggregations during winter. (Buttemer and William 1985). This is because birds in a larger roost can reduce the impact of cold weather by sharing body heat through clustering, which reduces the overall energy demand of thermoregulation and also allowing them to detect and respond to predators much more quickly (Beauchamp 1999). Therefore protection from predation is supplemental benefit of larger aggregations along with the surviving in extreme environment during winter.

Belonging to *corvidae* family, rooks (*Corvus frugilegus*) are known to form larger communal roosts which contain a few hundred to over thousands of individuals during winter (Ian R 1977, Coombs 1961). A single roosting site was not observed where count was not increased during winter in both the cities. Winter aggregations were impeccable to estimate the accurate population status compare to the count of other seasons. During winter season the population of the house crows was reached up to approximately 2500 individuals in Junadadh.

6. Decline in population during breeding season

House crow is monogamous and the pair bond remains unbroken for successive seasons (Archer 1998). During breeding season and seasonal climate changes movements and dispersions in population are known to occur in most of the bird species (Robinson 1992, Root 1988). The Indian House Crow has been observed to breed only once in a year, for a short duration of three to four months in hotter and drier months of summer (Nordin and Yousuf 1980) in the major part of its range in India (Baker 1922, Hume 1889, Lamba 1963, Salim Ali 1972 and Akhter *et al.* 1994). In Pakistan including Sind and Punjab, the breeding season of the House Crow progress with the start of the monsoon which extends from late June to August (Grimmett *et al.* 1998). In the present study, the roosting population of house crows was also found to be fluctuated during breeding season. Count was started decreasing from March and by mid-April, many of the crows were observed not to roost at their sites and used to disperse in their breeding territory.

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