



RESEARCH ARTICLE

Nesting and distribution pattern of house crow (*Corvus splendens*) in Western Rajasthan, India

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Abstract

The population of Indian house crow (*Corvus splendens*) has increased considerably in cities worldwide. In the recent past, there has been an increase in the population of house crows in the *Thar Desert* of western Rajasthan, India. A survey of 1004 km was conducted on roads connecting Jaisalmer-Jodhpur-Bikaner and Barmer districts. About 463 house crows were averagely sighted out of which on average, about 161 crows recorded sitting on the roads were feeding on accident-killed animals. The density of crows in the study area was 15.37 crow/sq km. A total of 489 nests were observed during the roadside survey, of which about 69.5% (340) were found on the *Acacia tortilis*. Almost all nests were located at a height of 20 to 40 ft. The nest height on *A. tortilis* ranged from 25 to 30 ft only and ranged from 25 to 40 ft on *Azadirachta indica*. The scenario of the desert has changed owing to developmental activities, which may further facilitate the population growth of crows in this part of the desert.

Keywords: Desert, Nesting, Peri-urban, Anthropogenic, land use pattern.

Introduction

The Indian House Crow (*Corvus splendens*) is associated with large refuges and carcass dumps. House crow is considered a problem in several cities i.e. Mauritius, Singapore, Kolkatta, etc. (Feare and Mungroo 1989; Soh, *et al.* 2002; Dutta and Raut, 2013). Although in India, the house crow has its mythological importance, the presence of crows is not a nuisance except for a few places where they attack humans (Dutta & Raut 2010). Its population has increased in cities worldwide (Soh *et al.* 2002; Khara *et al.* 2009) in recent years.

There is a considerable change in the ecology of cities in western Rajasthan. The availability of water through the Indira Gandhi Canal (IG canal) has changed the land use pattern, resulting in a rise in the human population of these cities. Jaisalmer, Jodhpur, Bikaner, and Barmer represent major cities of India's western 'Thar' desert. There has

been an increase in their population size in past decades (Census of Rajasthan 2011). The increasing population and settlements have come up due to the installation of mega projects in the desert, like oil extraction, energy, and mining.

Increased water supply is supporting roadside plantations in and around cities, and trees of large crown cover are introduced for greening the city. As a result of this, the changes in the species composition and number have also changed in the cities (Singh, 2009).

As a result of the increased human population, the dumping sites have also increased proportionately, with this population of scavenging birds like Mynas, Crows, Kites Scavenger vultures, Tawny and Steppe eagles etc. also increased.

Indian House Crow is one species whose density and distribution are also dependent on anthropogenic factors. Studies have shown that house crow prefers an urban environment and often stays in places with large tree cover for roosting and nesting (Soh, *et al.* 2002).

The present study focused on the peri-urban roadside distribution of the House crow to estimate the distribution and nest selection sites on the roadside trees of roads connecting four major cities of western Rajasthan i.e. Jaisalmer, Barmer, Jodhpur, and Bikaner.

Materials and Methods

Western Rajasthan is a sandy plain lying northwest of the Aravalli Range. The annual rainfall is low, ranging from 100 to 200 mm. Temperatures range from 48 to 50°C in the

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summer, to below -2°C in winter. The major cities included in the study were Jaisalmer, Barmer, Jodhpur, and Bikaner. These cities are also adjoining each other and are connected with National and State highways (National highways NH-15, NH-114, NH-112 & State Highways (SH-38, 68).

There is a roadside plantation of trees like *Acacia tortilis*, *Azadirachta indica*, and, *Prosopis cineraria* etc., *Prosopis juliflora* is also grown in most of the places on the roadside. Some exotic trees like *A. tortilis* and *P. juliflora* were grown for dune fixation, whereas in some pockets of *A. indica* and some areas near the IG canal, *Eucalyptus sp.* is also grown on the roadside.

The surveys of about 1004 km were conducted on roads between April to June 2019 on hired and personal cars moving at 40 to 50 km/h speed. Forty-five road transects of different lengths were taken on roads connecting villages, cities, highways, etc. Observations on the sighting of crows, their activities, and sighting location were recorded, and the number of crow nests and their height from the ground were also recorded. In addition to this tree species were also noted in each road transect by direct observation method on both side of the road. Each transect was repeated at least three times, each observation was pooled, and the average was taken by rounding up averages. In addition to this information on road accidents, the height of the nest on the tree was calculated roughly taking an electric pole as a standard.

Information on the number of nest trees and the number of crows were collected up to the width of 50 ft on both sides of the road. Crows sitting on roads for feeding were also included in the count. The data were collected in the morning hours between 6:30 to 9:00 am.

During April to June 2019 the survey was planned during the nesting period of Indian House Crow. During this period, the trees had very few or small tender leaves, which enabled easy visibility of the nests. The identification of trees was carried out at the Botanical Survey of India.

Results and Discussions

In the present study, we have tried to find the importance of roadside trees and highways for house crows' distribution. During the survey on average, about 463 house crows were sighted about 3 times, and repeat visits on the same transects. The density estimation showed that there was 15.37 crow/ sq km (Table 2). On average 34 road kill animals were sighted on the road. The road kills included mostly reptiles, insects, mammals, and birds. The stray dog accidents were highest among the road kills.

About 489 nests were observed during the roadside survey, of which about 69.5% (340) were found on the *A. tortilis*. The Neem tree (*A. indica*) was found to be the second choice for nesting by house crow (64 nest); 13.1% whereas nests on Khejri (*P. cineraria*) were only 9.8% (48 nests). In

addition to this nests were also found on other 8 species of trees and large electric pylons (Table 1)

However, *P. juliflora* was the most common roadside plantation, but due to shrubby growth, very few nests were seen on this tree. The nests were usually found singly but in some trees, they were more than 1 up to 4 nests in a few trees.

The nests were located mostly at a height between 20 to 40 ft. The nest height on *A. tortilis* ranged from 25 to 30 ft only, and between 25 to 40 ft on *A. indica*. The low height of the nest was found on the *Salvadora oleoides* tree where the nest ranged from 20 to 25 ft. The range of nesting on high electric pylons was 30-40ft. The nests were found mostly at a height of 25ft on trees with a height of more than 30ft except for a few observations on *S. oleoides*. Almost all nests on *A. tortilis* were made at the branch junctions at approximately a height of 25ft (8 m) the range of nest height was from 20 to 40 ft (Table 1). The study conducted in Singapore also shows that a height of more than 25 ft is a requirement for the nesting of house crows (Soh *et al.* 2002), as there is an increase in the number of high canopy trees the nesting possibility may also increase. Mostly the nests were single per tree but few trees had more than one and very few had more than two nests.

Our observation (Table 2) shows that more nests were found in the trees on national highways 402 nests (0.60 nests/km) than on state roads 87 nests (0.26 nest/km) but the density of crow on National Highways were lower (13.6 crow/sq km) than the State Highways and connecting roads (18 crow/sq km). National highways are well maintained with more plantations of trees in comparison to state highways and the connecting roads of the villages. A significantly higher number of nests were found on the National Highways than on State and connecting roads. The high speed of vehicles and more traffic on highways increases the possibility of road accidents which was also found true as (70.6% of accidents were recorded on national highways). The high rate of road accidents was also proportionate to the number of crow nests (82.2% of nests were on the roadside trees on national highways). The numbers of crows sitting on roads for food were higher on National Highways, which may be associated with several accidents on highways of animals on which crow feeds (Table 3). Crows were sighted more on roads feeding on the carcasses of killed animals, some of the crows were seen on nests and some were found congregated near water spots on the roadside. It was also observed that crows preferred to stay congregated during the hot hours of noon in the lower canopy of large trees like *Ficus sp.*, and *Eucalyptus* near community tanks.

The increased distribution of house crows in the peripheral and non-urban areas of the western desert may

Table 1: Occurrence of house crow nests on the road side trees/pylons

Nest Site Trees /Pylons	No of Nests	Percentage	% Occurrence of trees	Height of the nests
<i>A. tortilis</i>	340	69.5	28.0	(25–30 ft)
<i>A. indica</i>	64	13.1	10.0	(25–40 ft)
<i>P.cineraria</i>	48	9.8	15.0	(23–30 ft)
<i>Ficus sp.</i>	5	1	0.5	(30–35 ft)
<i>Salvadora oleoides</i>	2	0.4	0.5	(20–25 ft)
<i>A. nilotica</i>	4	0.8	4.0	(25–30 ft)
<i>P. juliflora</i>	4	0.8	40.0	(25–30ft)
<i>A.leucopholea</i>	2	0.4	1.0	(25–30 ft)
<i>Albizia lebbeck</i>	1	0.2	0.05	(30 ft)
<i>Eucalyptus</i>	1	0.2	0.45	(40 ft)
<i>Delonix regia</i>	7	1.4	0.45	(25 ft)
Electric Pylon	11	2.2	0.05	(30–40 ft)
	489	Spearman correlation between No. of Nest and Tree Occurrence Shows R=0.4922 at p>0.05		

Table 2: Comparison of crow population and nests on road types

Type of Roads	Road distance covered (Km)	Average sighting (roundup averages of 3 observations)				
		No. of crows	Density (per Sq km)	No. of crows sighted on Road	No. of dead animals on the road	No. of Nests
National highways	669	282 (0.42/km)*	13.62	100	24 (0.04/km)	402 (82.2%)
State highways and Connecting roads	335	181 (0.54/km)	18	61	10 (0.03/km)	87 (17.8%)
Total	1004	463 (0.46/km)	15.37	161	34 (0.03/km)	489

be its survival strategy or opportunistic tendency to harbor any suitable place. This may also be alarming for this part of the country. With the availability of suitable nesting tree-like *A. tortilis* the range in the peri-urban locations for nesting has increased for Indian house crow.

In western Rajasthan, there were no large trees except in a few places, near village ponds or some old gardens. The scenario of the desert has changed a lot in recent decades owing to developmental activities of Mega energy Projects and other developmental activities are likely to increase road connectivity and construction/expansion of roads also which may increase roadside plantation (High canopy trees) that may further facilitate the population growth of crows in this part of the desert. A collared dove (*Streptopelia decaocto*) was also seen making nests on *A. tortilis* trees but the nests were mostly present in the peripheral part of *A. tortilis* and were also found at lower heights. In addition, *Apis mellifera* was also seen as commonly associated with the crow's nest on these trees. However, it was also observed that naturally grown *Prosopis cineraria* at some places on the roadside was high enough to qualify as a potential nesting site yet was not chosen by house crows may be due to human disturbance on the tree during April & May when *P. cineraria* are full of pods (local name '*Sangari*') which is an integral part of food

in the western Rajasthan, people use to collect them for food. However, some of the *P. cineraria* trees had nests that were not lopped.

The main choice for making a nest was *A. tortilis* (Forssk) Hayne, commonly known as 'umbrella thorn' native to arid and semi-arid areas of Africa and Middle East (Arabian Peninsula and Israel) (Ecocrop, 2009). This tree attains a height of about 25–35ft and its crown is dense, umbrella-like, and flat-topped, the leaves are compound which allows passing air easily and pose very less air resistance due to which the tree remains stable during high-speed winds of the desert.

The nesting sites on electric pylons ranged from 30 to 40 ft, which was lower than the nesting height of House crows in Kutch, Gujarat, which ranged from 45 to 47 ft (Ali *et al.* 2013). The typical selection of nesting sites like *A. tortilis*, electric pylons, etc., is in the absence of natural sites. These sites may allow the species to escape brood parasitism by Asian Koel also (*Eudynamys scolopaceus*) (Ali *et al.* 2007). The study conducted in Singapore by Soh *et al.* (2002) suggests that house crows selected nests in areas that were more urbanized and open, with higher disturbance, nearer bins and food courts, centre which seems different in western Rajasthan as the nest mainly were selected outside the cities

where the human disturbance was negligible however the nesting selection criteria by house crow follow a similar pattern. It reveals that *C. splendens* nesting sites according to environmental conditions like the availability of foods, assurance of the nest, nest building materials and life expectancy of young ones.

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