CENSUS OF ROOSTING INDIAN HOUSE CROWS (Corvus splendens) ON MOMBASA ISLAND.

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INTRODUCTION

The Indian House Crow (Corvus splendens) is an asiatic bird species, that was introduced to the coast of East Africa in the 1890s (Lewis & Pomeroy, 1989). From Zanzibar, where colonial authorities introduced the species to act as an urban scavenger, the species has spread into coastal areas of Tanzania, Mozambique, South Africa, Kenya, Somalia and Ethiopia. After being recorded for the first time in Kenya in 1947 in Mombasa, this omnivorous scavenger is now very common in and around Mombasa city and island, and has spread along the north and south coast, and also expanded its distribution inland, largely following the main Mombasa-Nairobi road and rail links (Lewis & Pomeroy, 1989). Perhaps the best example that demonstrates the remarkable adaptive behaviour of this bird species to human environments, is that of the preferred use by the crows of metallic wire for nest building, instead of plant twigs and branches, as reported from large cities in India (Altevogt & Davis, 1979). In and around Mombasa, the breeding season is well-defined, from September to January, with a marked peak in October (Brown & Britton, 1980).

The success of the Indian House Crow is considered to be the cause of the decline of some other bird species in the coastal area around Mombasa, such as Pied Crow (Corvus albus), Speckled Mousebird (Colius striatus), Morning Thrush (Cichladusa arquata) and Golden Palm Weaver (Ploceus bojeri) (Lewis and Pomeroy, 1993). The species is also causing harassment to people at some of the hotels along the Kenyan coast, and reportedly may cause economic losses by inflicting damage to crops and poultry (Yousuf, 1982; Dhindsa et al., 1991). In addition, the species has been reported to be a possible carrier and transmitter of diseases such as cholera and dysenteria (Munguti, 1984; Anonymous, 1995). In and around Mombasa, this crow has become a pest species, and attempts for its eradication and/or control

have been on-going since 1984. Control efforts have focussed on the use of traps, poisoned bait, shooting of adult birds and destroying of nests, eggs and chicks. The problems caused by the crows at the coast have even lead to the formation of a House Crow Control Committee to coordinate the control and eradication programme.

It is virtually impossible to monitor the success of control or eradication programmes without any basic data on the distribution and numbers of the crows. At present, no reliable data are available on the number of crows around Mombasa. As recommended in the minutes of the last House Crow Control Committee meeting, there is need for more research into the Indian House Crow. The aims of the present study were: [1] to count the total number of crows that roost on Mombasa island; [2] to assess which areas these crows mainly come from; [3] to study the group size and behaviour at their arrival.

METHODS

On 28 August 1995, from 4.30 p.m. to 7.00 p.m., counts were made of all crows arriving at Mombasa island from the surrounding mainland (north, west and south). Counts were made by observers stationed strategically at four observation points around the island (see Fig.1): KMFRI rooftop, Nyali Bridge, Makupa Causeway (Kibarani), and Likoni Ferry (on top of Cement silos). Birds that flew away from the island (i.e. in the opposite direction) were recorded as negative (substracted from the counting totals). The crows were counted per intervals of 15 minutes. Since most birds arrived in small to larger groups, the number of birds present in each group was recorded (although sometimes it was difficult to tell what was one group). Counting was sometimes aided by the use of binoculars, but most counts were performed by naked eye. The position of the different counting stations was chosen as to minimize the risk of double counts. Some small overlap might have occurred of counts at KMFRI and Nyali Bridge, but this might be compensated by the gap (although narrow) between the reach of Nyali Bridge and that of Makupa Causeway. We therefore believe, that the counts are reasonably accurate, and the effect of possible double counts is considered small and insignificant.

RESULTS

Table 1 summarizes the results of the counts. In total, we counted 19440 Indian House Crows crossing the water towards Mombasa island between 16.30 and 19.00 p.m. Besides Indian House Crows, only 2 Pied Crows were observed during the counts. The majority of the crows (12918 birds or 66.4%) arrived from the mainland north (combined counts from Nyali bridge and KMFRI), whereas 3376 birds (17.4%) arrived from the west (Makupa) and

3146 birds (16.2%) from the south (Likoni).

Figure 2 shows the distribution of the arrival of the birds over time. The peak of arrival was between 17.45 and 18.15 p.m. Data for each individual counting station yielded similar temporal patterns. From this figure it becomes clear that the counting period covered nearly all the arrivals, and that the number of birds which arrived prior to 16.30 p.m. or after 19.00 p.m. (when it became too dark to observe anything) is likely to be insignificant.

Prior to crossing the water, the birds often appeared to gather in tree tops, roofs and electricity poles & wires at the water edge. After their aggregations had reached a certain size, they started crossing the water as a large group. The size of such groups varied considerably, but usually ranged from 25 to 85 birds. This phenomenon was most noticeable during the peak period of arrival, that is between 17.45 and 18.30 p.m. It is noted, however, that at least half of all our observations concerned groups of less than 20 individuals. Generally, our observations indicate that the birds preferred to cross the water towards Mombasa island at sites where the water body was narrowest. Such crossing sites occur at Makupa and Kipevu causeways, around Nyali Bridge and at Likoni, and to a lesser extent also around KMFRI (opposite Fort Jesus). All these observations suggest that the crows fear to cross over large water bodies (unless in large aggregations).

DISCUSSION & CONCLUSIONS

This study provides the first detailed record of numbers of Indian House Crows around Mombasa. The total number of crows that was counted (19440 birds) does not include the resident crow population of the Mombasa island itself, but only concerns birds that arrive here from elsewhere for gregarious roosting. The resident crow population of Mombasa (those that do not leave the island during the day) remains yet to be studied.

Preliminary observations indicate that the crows arrive from areas up to as far as Kikambala (20 km from Mombasa) in the north and from areas up to as far as Tiwi (c. 20 km from Mombasa) in the south. If this is extrapolated similarly 20 km to the west (that is up to as far as Mazeras and Rabai), than it means that the total surface area from which the crows arrive for gregarious roosting in Mombasa totals up to around 800 km^2. This means that the average density of Indian House Crows is estimated to be around 24 birds per m^2 for the entire area around Mombasa (or between 32 and 35 birds per m^2 in the area north of Mombasa, and about 16 birds per m^2 in the area south and west of Mombasa). These estimates are very rough but give a good indication of the extent of the crow problem. In Zanzibar, which has a surface area

of about 2400 km², Tony Archer reported a total number of approximately 60,000 crows (Anonymous, 1995), which is equivalent to a density of 25 birds per m², and compares well to our estimated average density of 24 birds per m² around Mombasa.

It has not yet been established where exactly the crows gather in Mombasa after arrival on the island, but preliminary observations indicate a rather scattered distribution with a strong preference for large old trees, such as can be found near the railway station, around Treasury Square and in parts of Old Town.

The fact that the majority of the crows arrive from the mainland north is especially noteworthy, since this is the area where the majority of coastal tourist hotels are located. The species appears to be especially attracted to (uncovered) garbage sites where food rests are dumped. Distribution of the species further north includes disjunct populations at Malindi and Watamu, which appear to have established between 1977 and 1980, and were probably derived from birds released locally (Britton, 1980).

Unlike in Zanzibar, where the majority of the crow population has been killed using DRC 1339 poison and traps (Anonymous, 1995), the current control programme in the coastal area around Mombasa does not seem very successful. In order to effectively monitor the success of a control programme, it is suggested to perform a regular census of the kind described in this paper. The changes in numbers arriving from the north, west or south of Mombasa will indicate the rate of success of the eradication programmes of the species in these respective areas.

Apart from monitoring the success of control programmes, future studies on the Indian House Crow may focuss their attention on: (1) the identification and census of other roosting sites along the coast; (2) comparison of census results between counts in the evening (such as in the present study) with those obtained in the early morning (to which direction do they fly?); (3) study of pellets to be gathered at their roosting sites to study their food composition; (4) inventory of the resident population of crows on the Mombasa island; (5) identification of their breeding areas (also of the Pied Crows); (6) monitoring of the further distribution and spreading of the Indian House Crow in Kenya (and/or the increase in their numbers); (7) interaction with other bird species (decline). In addition, other possible ways to control the crow pest should be investigated, including the use of repellents and reflecting tape, as proven successful in the control of other bird pest species (DWRS, 1995).

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FIGURE 1.

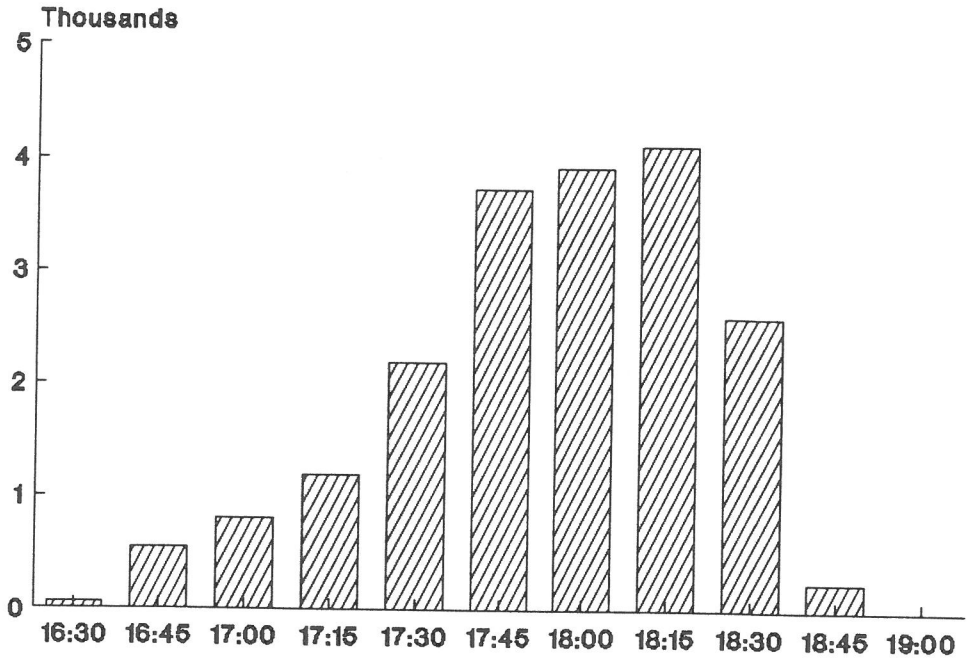
Map of the Mombasa area, showing the location of the counting stations mentioned in the text.

FIGURE 2.

Total number of Indian House Crows counted (combined for the four stations) for each time interval.

Table 1.
Results of counts of Indian House Crows crossing towards Mombasa island at the four observation points during the different time intervals (date: 28 August 1995)

Time interval:	KMFRI	Nyali bridge	Makupa/ Kibarani	Likoni	Total:
16.30-16.45			62		62
16.45-17.00	58	311	12	170	551
17.00-17.15	105	408	116	185	814
17.15-17.30	254	631		307	1192
17.30-17.45	532	872	379	415	2198
17.45-18.00	806	1733	730	464	3733
18.00-18.15	1061	1489	834	538	3922
18.15-18.30	863	1726	800	728	4117
18.30-18.45	607	1218	443	329	2597
18.45-19.00	146	98		10	254
Total:	4432	8486	3376	3146	19440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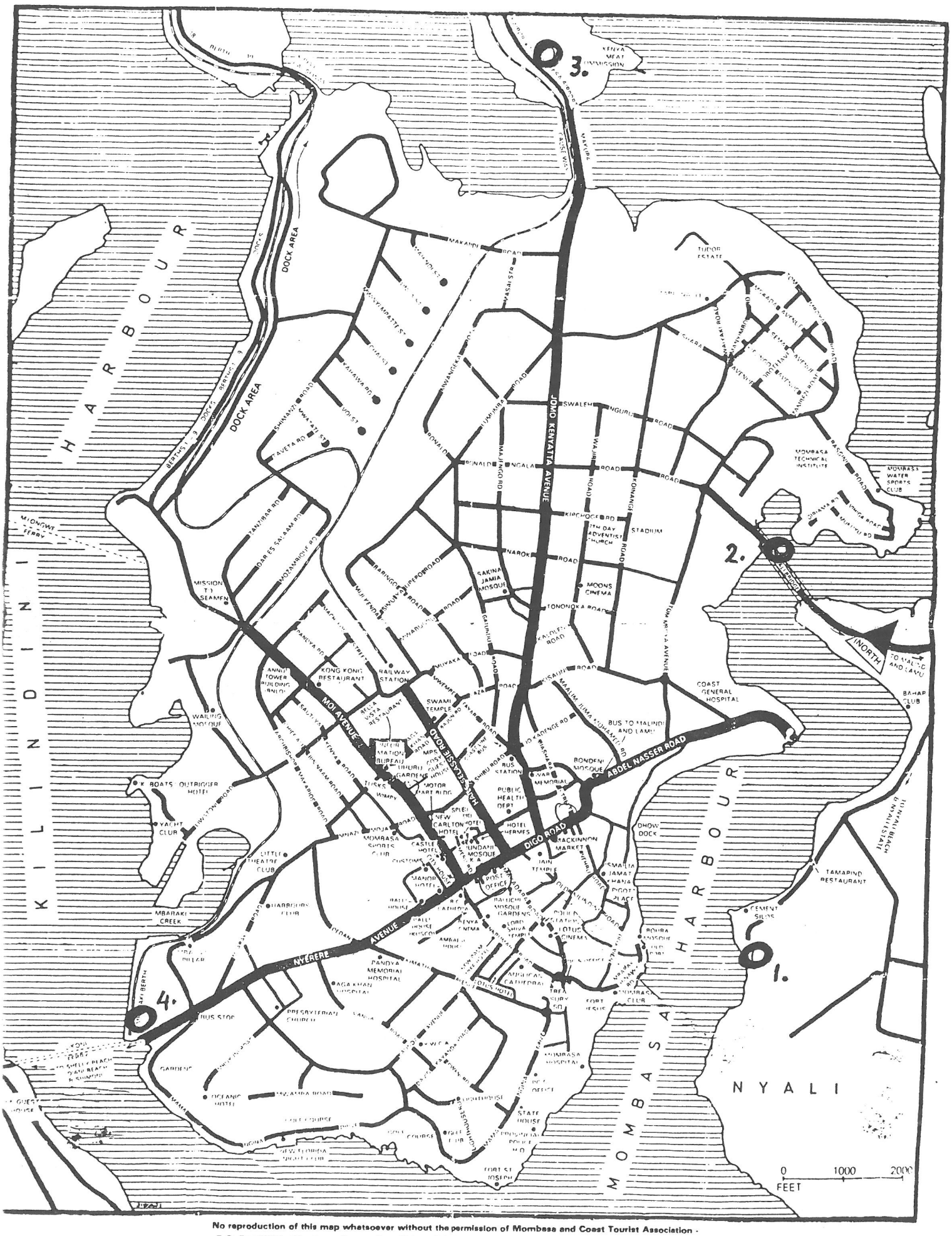

Fig. (1)