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SECOND BREEDING SEASON OF *CORVUS SPLENDENS* IN SOME PARTS OF INDIA : AN EXPLANATION FOR

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(With 3 Tables)

INTRODUCTION

The Indian House Crow needs no introduction. It is by far the commenest bird in India. So close has its association been with man that it has found its way in the Indian Folklore and even Hindu Mythology. Its intelligence and cunning are proverbial. Salim Ali (1972 : 244) writing about this bird comments "A confirmed commensal of man, almost an element of his social system. Very useful as a municipal scavenger and an indispensable ally to neglectful or incompetent sanitary administrations : Intelligent, inquisitive and impudently familiar, yet excessively wary and alert at all times, possessing an uncanny capacity for scenting and avoiding danger and distinguishing a harmless human from one not to be trusted. Gregarious, sociable, clannish, cunning, and omnivorous—other essential qualifications for successful coexistence with man"

OBSERVATION

The Indian House Crow, *Corvus splendens* has been observed to breed only once in a year, for a short duration of three to four months during summer in the major part of its range in India. (Baker, 1922: 33; Hume, 1889 : 9; Lamba, 1963:123; Salim Ali, 1972: 91) The author has been working on the nidification breeding biology of Common Indian birds in various parts of India for more than 20 years (Lamba, 1963 THROUGH 1970). He has not come across this species breeding in winter anywhere in India except Ratnagiri and Goa, where it breeds in winter (Lamba, 1975 : 38). Both Hume (1889:9) and Baker (1922:33; 1932:16) have also recorded this species breeding at Ratnagiri in Winter.

DISCUSSION

The author found it quite intriguing that a bird which breeds only once a year and prefers to breed elsewhere in summer should breed in Ratnagiri and Goa in winter again. A search in the existing orni-

thological literature revealed that Baker (1932:16) as well as Salim Ali & Ripley (1972:245) had offered some explanations for the second breeding in the House Crows. Baker (1932:16) writes, "In the two seasons I believe there are two sets of birds breeding and not the same lot of birds breeding twice and rearing two broods, for nests which are used annually are never used twice in the same year." Where as Salim Ali & Ripley (1972: 245) maintain that " Some birds (probably of the previous year, C.15 or 16 months old) breed October-December."

The studies on the breeding biology of birds all over the world indicate that the breeding activity in birds is initiated by a complex of factors like:—

a. Natural instinct.
b. Physiological changes, brought about by the changing conditions of the habitat and the various ensuing ecological stimuli such as quantum of sunshine, temperature, precipitation and availability of food etc.

It has been the experience of various workers all over the world that these factors effect different species differently in the same or different areas of the globe. Rowen and Bissonnettee (in Linsdale, 1933) attached paramount importance to light (more sunshine), claiming it to be the biggest single factor responsible for breeding activity in birds. Linsdale (1933) commenting on their theory writes "If the time of the beginning of the breeding cycle were entirely or even largely determined by the length of day, we might expect birds in the same latitude to have closely similar calendar for breeding activities." In the same paper he shows that in two such regions in Western United States viz. California and Kansas, the height of the breeding season is attained in April, May in California and in June in Kansas, the differences in season depending upon temperature and precipitation. Winterbottom (1935) had found in three districts of North Rhodesia in the same latitude birds breeding at different times, temperature, humidity and altitude being the determining factors. Skutch (1950) has observed the Humming birds in Western highlands of Guatemala to commence nesting when the days start becóming shorter.

Pitt (1929) illustrated the stimulating influence of warm weather and restricting influence of cold on the breeding activities of some avian species in Norway. Pickwell (1931) established a correlation between the temperature and the start of nesting in the case of *Otocoris alpestris praticola*. Nice (1937) observed that the song sparrow started laying

days after the maximum day temperature averaged 22.9°C for 3 successive days at Interpont (Ohio U.S.A.). But in Central America and India a number of species have been observed when the temperatures are falling (Vantyne & Berger, 159 : 314; Lamba, 1963 : 111).

In the desert areas of Africa and Australia, Moreau (1950) and Keast and Marshall (1954) often found the rainfall as the stimulus for reproduction, whereas in Western Guatemala Skutch (1950) found a great majority of birds nesting at the height of the dry season.

Moreau (1936) has found a "single breeding season of surprisingly short duration" in the birds of evergreen forests in the East Africa. He discusses as possible stimuli, light, temperature, precepitation and food supply, deciding against any "single factor Hypothesis." Nothing could therefore be more logical than Skutch's (1950 : 212) conclusion after his prolonged studies on the breeding of Central American birds, that "If any single astronomic or climatic cycle tends directly to stimulate the reproductive activities of birds, its action is so weak that any species which finds conditions peculiarly favourable for reproduction at some divergent season of the year may escape its control."

In order to have a better idea of some of these factors involved at Ratnagiri and Goa I requested Mr. C.R.V Raman, Dy. Director General of Observatories at Poona for climatological data for Ratnagiri and Marmugoa from 1968-1970, which he was kind enough to supply. This data comprises of Mean Maximum and Mean Minimum temperature, mean monthly rainfall, mean monthly humidity and mean monthly length of the day and is tabulated for Ratnagiri (Table 1) and Marmugoa (Table II) separately. For the sake of comparison similar data for Poona is also given (Table III).

A study of this data reveals both at Ratnagiri and Goa the general climatic conditions of temperature, rainfall, humidity and length of the day during April-May, the main breeding season before the onset of Monsoons; and November-December, the secondary breeding season after the rainy season, are almost similar. The Mean Maximum temperature ranges from 31.1°C to 33.5°C in April-May and 31.6°C to 33.8°C in November-December. During the rest of the year it remains 2-5°C lower. The mean minimum temperature during April-May for both areas is highest i.e. 25.1 to 27.8°C. In November-December it again rises but only upto a maximum of 24.3°C.

The mean relative humidity for both the areas in April-May remains 72-75%. It increases up 91% during the rains and again drops to 50% to 74% in November-December.

The mean monthly rainfall for Ratnagiri and Goa during April-May is 0.00 mm. to 64.1 mm. It shoots upto 866 mm. to 1417 mm. during the rains and again drops down to 0.00 mm. to 55.7 mm. during November-December.

The mean length of the day increases during April-May at Ratnagiri and Goa ranging from 12.5 to 13 hours. In November-December it

TABLE—I : RATNAGIRI

YEAR	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	ANNUAL
					Mean of daily maximum temperature : °C.								
1968	30.2	29.2	32.1	31.5	31.8	30.8	28.9	29.1	30.0	32.5	33.7	32.4	
1969	31.5	30.7	31.4	33.0	33.5	31.4	28.9	29.3	28.3	32.2	32.5	33.1	
1970	30.5	30.0	30.2	32.1	—	29.7	29.3	28.4	28.8	31.5	33.8	32.0	
					Mean of daily minimum temperature : °C.								
1968	19.3	18.9	22.8	24.4	25.9	25.3	24.3	24.8	23.9	22.8	21 7	20.5	
1969	18.8	19.9	23.0	26.3	27.6	25.1	24.5	24.3	23.6	23.7	23.7	21.7	
1970	19.2	19.7	21.7	25.5	—	24.6	24.5	24.2	23.8	23.5	20.0	19.9	
					Mean relative humidity (%) 0830 *hrs. I.S.T.*								
1968	66	74	66	75	73	85	90	86	89	73	56	60	
1969	67	74	81	74	72	88	90	91	91	78	71	59	
1970	73	72	74	73	—	89	87	90	91	82	50	53	
					Rainfall (*mm*)								
1968	0.0	0.0	0.3	13.2	0.0	728.2	717.4	166.1	203.3	113.1	1.3	0.0	
1969	0.0	0.0	0.0	0.0	0.7	654.4	1417.7	422.6	740.5	37.6	55.7	0.0	
1970	0.0	0.0	0.0	0.3	—	1020.6	850.8	639.3	160.3	30.6	0.0	0.0	
					Maximum possible hours of Sunshine. (Length of day Bombay)								
	11.2	11.5	12.0	12.5	13.0	13.3	13.2	12.8	12.2	11.8	11.3	11.1	

TABLE—II : MARMUGOA

YEAR	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	ANNUAL
						Mean of daily maximum temperature : °C.							
1968	29.7	28.6	30.8	31.2	31.1	29.6	28.1	28.5	29.0	30.6	32.5	31.6	
1969	30.2	30.0	—	32.2	32.5	29.9	28.4	28.8	28.0	30.4	31.6	32.4	
1970	—	29.8	29.8	—	—	29.9	29.2	28.2	28.9	31.4	33.8	32.6	
						Mean of daily minimum temperature °C.							
1968	21.1	21.8	24.1	25.1	26.3	25.0	23.7	24.3	24.1	23.7	23.6	22.5	
1969	21.2	22.3	—	27.0	27.8	24.6	24.2	24.2	23.6	24.4	24.3	23.6	
1970	—	22.1	23.5	—	—	24.5	24.0	23.9	23.8	24.7	23.0	19.8	
						Mean relative humidity (%) 0830 *Hrs. I.S.T.*							
1968	65	75	70	74	72	87	89	86	87	77	60	62	
1969	66	74	—	73	72	86	86	—	89	80	74	62	
1970	—	71	76	—	—	89	88	90	86	83	60	54	
						Rainfall (*mm*)							
1968	0.0	0.0	0.0	64.1	6.8	644.3	1062.4	148.0	116.8	181.8	16.4	0.0	
1969	0.0	0.0	—	1.5	2.2	866	596.5	283.7	574.5	30.5	75.1	0.2	
1970	—	0.0	0.0	0.2	0.0	768.9	661.6	975.1	200.1	21.9	0.0	0.0	
						Maximum possible hours of sunshine.							
						(Length of day Bombay)							
	11.2	11.5	12.0	12.5	13.0	13.3	13.2	12.8	12.2	11.8	11.3	11.1	

TABLE—III : POONA

YEAR	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	ANNUAL
						Mean of daily maximum temperature : °C.							
1968	28.4	31.9	34.7	37.9	37.8	33.2	28.5	27.5	30.4	31.2	29.9	29.4	
1969	30.2	33.6	37.3	39.4	38.2	32.7	28.1	27.8	28.4	32.9	31.2	29.3	
1970	30.0	32.8	35.7	38.4	37.5	31.0	28.1	27.0	28.4	31.7	30.4	29.1	
						Mean of daily minimum temperature : °C.							
1968	10.0	11.3	16.1	19.8	21.4	23.3	22.3	21.4	21.0	16.6	12.3	10.7	
1969	9.0	12.2	16.8	21.2	23.3	23.3	22.5	21.4	20.9	17.6	16.7	13.1	
1970	11.2	13.8	16.0	21.5	23.5	22.9	22.0	21.7	20.8	18.3	10.3	6.6	
						Mean Relative Humidity (%) 0830 *Hrs. I.S.T.*							
1968	77	64	51	40	47	71	82	81	82	75	67	67	
1969	71	59	48	46	53	75	83	87	84	69	70	60	
1970	68	67	49	46	58	78	85	88	83	80	58	63	
						Rainfall (*mm*).							
1968	0.1	0.0	0.9	0.0	0.0	67.1	89.2	60.0	138.6	87.8	11.0	0.4	
1969	0.0	0.0	0.0	5.5	0.0	118.4	276.2	214.7	118.2	6.3	13.2	0.4	
1970	0.0	0.0	0.0	3.3	48.3	84.4	132.9	79.6	39.4	108.8	0.0	0.0	
						Maximum possible hours of Sunshine.							
						(Length of day Bombay)							
	11.2	11.5	12.0	12.5	13.0	13.3	13.2	12.8	12.2	11.8	.11.3	11.1	

is decreasing from 11.3 to 11.1 hours. But we have to consider the amount of Sunshine which increases suddenly after the cloudy days of the rainy season.

Another, rather strong factor accredited with the initiation of avian breeding which could not be ascertained directly is the "amount of food available for the nestlings" But as the House Crow almost entirely lives off the Human race; it might be safe to presume that the amount of food available to House Crow in both these areas in November-December is not substantially less than that available in April-May.

CONCLUSION

On account of the foregoing observations I am inclined to believe that some House Crows breed at Ratnagiri and Goa again after rains in November-December because climatic factor involved in breeding of Crows are duplicated at that time. This belief is further strengthened by a comparison of the climatological data of Poona (Table III), where the House Crow breeds only once a year in April-May, to that of Goa and Ratnagiri. At Poona we find that the mean maximum temperature during April-May is 37.5°C to 39.4°C. In November-December it never rises above 31.2°C. Similarly the mean minimum temperature of 19.8°C to 23.8°C of April-May drops further down to 6.6°C to 16.7°C. The mean relative humidity in November-December, 58% to 70% is much higher than that of April-May, which is only 40% to 58%. The mean monthly rainfall in April-May (0.00 to 48.3 mm.) is much more than that of November-December (0.00 to 13.2 mm.).

The climatic conditions, of April-May at Ratnagiri, Goa and Kerala are duplicated only to some extent in November-December but they fail to reach the "optimum" to effect the whole population.

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SUMMARY

The Common House Crow, *Corvus splendens* breeds throughout India at the height of Summer Season, invariably before the onset of rains between April and July. In some parts of India, like Ratnagiri, and Goa however, this crow has been observed to breed again after the rains in November-December.

While investigating the cause of this second spurt of breeding activity in this species after a gap of barely 4-5 months, it was discovered that accredited climatic stimulii causative of avian breeding like temperature, rainfall, humidity quantum of light etc., are duplicated in November-December in these localities, thereby compelling some House Crows to breed.

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