

RESEARCH PAPER

## Breeding activities of some urban birds

BHARAT M. VYAS

Accepted : August, 2009

### ABSTRACT

To make a study, four sites of Visnagar city were selected. The sites were the spaces where species were building the nest. The nest was given particular code number and was constantly observed for the whole season. The nest in which the first egg was laid, the egg was given a number and thus the clutch size was fixed. Due to constant observation, it was possible to notice the incubation period and nesting period. Total 20 species were studied due to available satisfactory data during the study period. Hawk eagle required maximum days (26) for nest building *i.e.* more than three weeks. Two species, Yellow-footed green pigeon and Red-wetted lapwing construct their nest within a week. Other 17 species required two or three weeks. Clutch size was recorded in between 1 to 6 eggs, within a population. Observed species required two to three week periods for incubation and two to four weeks for nestling. It was evaluated that 13 species required less than two months for nesting period and other 7 species required more than two months.

Correspondence to :

**BHARAT M. VYAS**

Department of Zoology, Nootan  
Science College, Visnagar,  
MEHSANA (GUJARAT)  
INDIA

**Key words :** Clutch size, Nest building, Incubation, Nestling, Nesting.

Any healthy ecosystem depends on the fertile biodiversity of that ecosystem. The progeny and population are maintained in the habitat only when it breeds. In that reference of species for the ecological study of any place, the study of population as well as its related breeding biology of that place become necessary. The birds have not been counted in which the minimum data have been recorded. At the end, 20 such birds have been selected and the breeding activity of those birds has been targeted in this paper. In Gujarat, this kind of work in individual bird is done at various places and time. Mathew and Naik (1986) on *Passer domesticus*, Patel (1986) *Columba livia*, and Naik and Razack (1967) on house swifts, *Apus affinis*. Balen (1973) worked on *Parus major*, Immelmann (1971) on ecological aspects of periodic reproduction, Jones (1972) on food as proximate factors regulating the breeding season. The same kind of work on individual has been carried out in different countries. Mayfield (1961-1975) and Jhonson (1979) described a method of calculating nest success. Annual productivity and its measurement in a multi brooded, *Passarine* was studied by Pinkowski (1979). Avian demography such as clutch size, nesting success and survival rates were studied by Hickey (1952), Nice (1957) and Ricklefs (1969).

### MATERIALS AND METHODS

#### Study area :

For the study on breeding activities of some urban

birds, Visnagar city area and its vicinity was selected. Visnagar is a taluka place of Mehsana district, which is about 750 years old. It is situated between 23°42' N and 71°34' E above 127 m.s.l. Being a taluka place, it is surrounded by rural areas.

To make a study, four sites of Visnagar city were selected. The sites were the spaces where species were building the nest. The nest was given particular code number and was constantly observed for the whole year. The nest in which the first egg was laid, the egg was given a number and thus the clutch size was fixed. Due to constant observations, it was possible to notice the incubation period and nesting period. Some nests, which were found for once, and then deserted, were not counted. The egg, which had not been hatched and why they failed, was noted during the year. And in the same way, it was also noted in the case of chicks. Thus, the reasons of egg mortality and chick mortality have been noted. Wherever the fledgling became possible, such nests were targeted and 'the fledgling success of each species was recorded. During the whole year, nest material, nest size, place of nest based on its selected place etc. of each species were recorded time to time.

### RESULTS AND DISCUSSION

Birds have been selected for the breeding activity *viz.*, nest building period, cultch size, incubation period, nestling period and nesting period of those birds which have been targeted in this paper.

**Nest building period:**

Table 1 shows that only one species Changeable hawk eagle required maximum days (26) for nest building *i.e.* more than three weeks. Two species, Yellow-footed green pigeon and Red-wetted lapwing construct their nest within a week. Other 17 species (Table 1) required two or three weeks.

<u>Week required</u>	<u>Number of species</u>
One week	02
Two weeks	09
Three weeks	08
More than three weeks	01

Availability of nesting materials at a time or a scarcity of materials is one of the reasons for duration of nest building period (NBP). It was observed that for Sunbird if smooth fruit fibres are easily available, it covers NBP within three days. Yellow-footed green pigeon picks up semi-dry twigs of host tree for NB, which is easily available during its breeding season. It uses mostly the twigs of *Azadirachta indica*, *Prosopis spicigera*, *Bombax ceiba* and *Cassia* species. Eagle and Shikra are habituated to reconstruct their nests, which require long period. In these species, copulation also occurs within mate after one-week interval. If both partners take part in nest construction, it requires less period *e.g.* sunbird,

pigeon, dove, etc. Nest size and nest materials are also under consideration because small nest size and available material is important. Mating response from female is also responsible. Inter specific struggle for the selection of a partner also delays nest construction *e.g.* eagle.

**Clutch size:**

Clutch size is an important parameter determining the reproductive rate in bird. It is presumed that clutch size is genetically determined, though it can be modified to a limited extent by the environment. It is also generally accepted that the clutch size of any species is the product of natural selection and so adjusted as to maximize the parental contribution to the next generation energy expenditure in raising a brood.

Within a study area and period, 20 species were under observation for their nesting activities. Clutch size was recorded (Table 1). It ranged from 1 to 6 eggs, within a population. One species Changeable hawk eagle, *Spizatus cirrhatous* lays only one egg. 13 species (65% of the breeder's population) showed moderate clutch size (2 to 4). More than 5 eggs were observed in 6 species. The variation of clutch sizes were observed in different regions and of different birds by Panicker (1980). He studied four species at different localities and concluded that normal clutch size was 3 to 4 in species of Myna, Roller and

**Table 1 : Breeding schedule and clutch size of some urban birds**

Sr. No.	Name of birds	Nest building period (days)	Egg laying period (days)	Clutch size	Incubation period (days)	Nesting period (days)	Nesting period (days)
1.	Cattle egret	16	06	03 – 05 (29)	16 - 21	38	78
2.	Little egret	17	07	03 – 04 (10)	20	39	76
3.	Black-headed Ibis	15	08	02 – 04 (21)	18	36	77
4.	Black kite	18	04	02 (02)	25	29	77
5.	Changeable hawk eagle	26	01	01 (01)	29	27	83
6.	Shikra	20	04	03 – 04 (04)	28	28	84
7.	Red wattled lapwing	07	08	04 (05)	16	18	48
8.	Yellow footed green pigeon	05	03	02 (05)	13	18	42
9.	Rock pigeon	09	04	02 (18)	15	21	49
10.	Eurasian collared dove	05 – 10	05	02 (07)	15	21	48
11.	Laughing dove	06 – 11	04	02 (04)	14	20	46
12.	Rose ringed parakeet	14	07	04 – 06 (12)	13 - 18	20	50 – 55
13.	Brahminy starling	10	05	03 – 04 (06)	11 - 14	14 - 21	47
14.	Common myna	09	06	04 – 05 (04)	12 - 16	17 - 25	42
15.	House crow	16	08	04 – 05 (05)	18	23	65
16.	Red-vented Bulbul	15	05	02 – 03 (06)	14	15	49
17.	Purple sunbirds	08	06	02 – 03 (09)	13	15	40
18.	House sparrow	13	07	03 – 05 (08)	14	16	50
19.	Baya weaver	17	06	02 – 04 (05)	12	17	47
20.	Indian silver bill	11	05		13	14	43

\* Figures in parenthesis indicate total number of nests observed

Barbet. Some variation was noticed in relation to the localities. Climatic conditions and even a change of season influence the clutch size (Lack, 1947 and 1948 and Parkhurst and Lack, 1946). The South rarely exceeded four, where as in Delhi, it was up to six.

In this urban habitat, moderate and large clutch size is responsible for moderate number of bird population, though egg and chick mortality also play its role in maintaining bird population. Generally it is observed that 85 % of breeder species within a study area complete their clutch size within less than one week. Only three species (Table 1) require 8 days.

#### **Incubation period:**

Incubation period is the interval between the laying of the first egg and hatching of that egg within clutch. Incubation is the process whereby the heat necessary for embryonic development is applied to eggs after they are laid. Such heat is derived from the body of the parents. The heat transfer is affected by a close application of the brood patch to the eggs. By control of incubation behaviour, parents keep the eggs at a uniform temperature (between 34°C - 39°C) depending on the temperature. Still however, environmental temperature has some effects on the length of incubation period. It was studied by Patel (1986) in *Columba livia* in tropical climate.

Within 20 observed species, more than three-week periods were required in Black kite, Changeable hawk eagle and Shikra. It shows that raptors required long period for incubation, 8 species required only two weeks and 9 species required within two to three weeks (Table 1).

#### **Nestling period:**

It is defined as the interval of time the last chick of the brood remained in the nest. It was studied within 20 breeder species. In tropical climate, it requires weekly variation among 20 species. Only one species, Indian silverbill, *Lonchura malabarica* required two weeks. Major species (55%) require three weeks, and 5 species required four weeks. Proper reasons were not studied but presumed that available food source for chicks might be the main factor.

#### **Nesting period:**

Nesting period is defined as interval of time between the laying of the first egg to the nest leaving by the last chick. Table 1 gives detailed observation of 20 breeder species. It was evaluated that 13 species required less than two months for nesting period and other 7 species required more than two months. The range was 40 – 84 days in different 20 breeders species. It might be variable due to several causes such as availability of food, quantity

**Table 2 : Hatching success of some urban birds**

Sr. No.	Name of birds	Total number of eggs	Total number of eggs	Total number of chicks	Hatching success %	Fledgling success %
1.	Cattle egret	29	96	48	50	36(35)
2.	Little egret	10	31	14	45	26(08)
3.	Black-headed Ibis	21	67	37	50	37(25)
4.	Black kite	02	04	02	50	25(01)
5.	Changeable hawk eagle	01	01	01	100	100(01)
6.	Shikra	04	14	09	64	43(06)
7.	Red wattled lapwing	05	18	12	67	39(07)
8.	Yellow footed green pigeon	05	08	04	50	25(02)
9.	Rock pigeon	18	31	21	68	45(14)
10.	Eurasian collared dove	07	14	06	43	29(04)
11.	Laughing dove	04	08	04	50	25(02)
12.	Rose ringed parakeet	12	48	26	54	35(17)
13.	Brahminy starling	06	19	08	42	26(05)
14.	Common myna	04	16	07	44	38(06)
15.	House crow	05	15	08	53	27(04)
16.	Red-vented bulbul	06	10	06	60	50(05)
17.	Purple sunbirds	09	25	13	52	32(08)
18.	House sparrow	08	33	18	55	36(12)
19.	Baya weaver	05	15	09	60	33(05)
20.	Indian silver bill	05	23	13	57	30(07)

\* Figures in parenthesis shows number of fledge

**Table 3 : Breeding performance within a population**

Sr. No.	Breeding performance	Percentage
1	Breeders within a population	44
2	Egg mortality	46
3	Chick mortality	66
4	Hatching success	54
5	Fledgling success	34

and quality of food, climatic factors and growth rate.

Over all breeding performance is as common as it was recorded in other area at different time. Among 103 species 44% species breed in this climate which is semi-arid. Hatching success is more than 50% but fledging success is less than 50%, it means 34% biomass generate to next generation by parents. It is enough to maintain general population.

## REFERENCES

- Balen, J. H. Van.** (1973). A comparative study of the breeding ecology of the Great tit, *Aprus major* in different habitats. *Ardea*, **61**: 1–93.
- Hickey, J. J.** (1952). Survival studies of banded birds U. S. Fish Wildl. Serv. Spec. Sci. Rep.
- Immelmann, K.** (1971). Ecological aspect of periodic reproduction. pp 341 – 389 in Farner. D. S and King. J. R. (eds) *Avian Biology*, Academic Press – New York. pp. 586.
- Jhonson, D. H.** (1979). Estimating nest success: the Mayfield method and an alternative. *Auk*, **96**: 651 – 661.
- Jones, P. J.** (1972). Food as a proximate factor regulating the breeding season of the Great tit, *Aprus major* Proe. *Int. Orn. Cong.*, **15**: 657 – 658.
- Lack, D.** (1947). The significance of clutch size. *Ibis*, **89**: 302 – 352.
- Lack, D.** (1948). The significance of clutch size. *Ibis*, **90**: 25 – 45.
- Mathew, K.L.** and Naik, R.M. (1986). Interrelation between molting and breeding in a tropical population of the house sparrow, *Pesser domesticus*. *Ibis*, **128**: 260–265.
- Mayfield, H.** (1961–1975). Nesting success calculated from exposure. *Wilson Bull.*, **73**: 255 – 261.
- Naik, R. M.** and Razack, Abdur (1967). Regulation of breeding in house swift. *Pavo*, **5** (1): 75 – 96.
- Nice, M. M.** (1957). Nesting success in antiracial birds *Auk*. **74**: 305 – 321.
- Panicker, K. N.** (1980). Ecology of hole-nesting birds. *J. Bombay Natural Hist. Soc.* **75** (Supp): 1227 – 1237.
- Parkhurst** and Lack, D. (1946). The clutch size of yellow Hammer, *Brit. Birds*, **39**: 358.
- Patel, M. I.** (1986). Ecological studies on the feral pigeons in a tropical urban area, Ph. D. Thesis, Saurashtra Uni., Rajkot.
- Pinkowski, B. C.** (1979). Effect on a severe winter on a breeding population of Eastern bluebird jack, *Pine Warbler*, **57**: 8 – 12.
- Ricklefs, R. E.** (1969). An analysis of nesting mortality in birds. *Smithsonian Contrib. Zool.* **9**: 1– 48.

\*\*\*\*\*  
\*\*\*\*\*