



Breeding Performance of Palm Dove (*Streptopelia senegalensis*) in and Around Sikar (Rajasthan), India

Dr. Maha Singh
Rao

Lecturer in zoology, Govt. S. K. (P.G.), College, Sikar (Rajasthan), India. 332001.

ABSTRACT

Breeding performance of the Palm Dove (Streptopelia senegalensis) was studied in Sikar region, Rajasthan state during March, 2008 to November, 2009. The population of S. senegalensis was more observed in human habitat region than the non-human habitat region of the study area. Palm Dove is a common breeder bird in this region. During study period total 24 nests were observed. Breeding period was observed March to November in 2008 and 2009. S. senegalensis prefers medium and small, leafy and dense bushes and tree for the nesting. It prefers different plant species as a nesting site. It is found that the hatching success was 53 %, nestling success was 37% and nesting success was 19 %. It is found that in this region the breeding performance of the Palm Dove was low. Reasons for the low breeding performance are due to predation, food availability, starvation and desert environmental conditions.

KEYWORDS : Sikar, Palm Dove (*Streptopelia senegalensis*), Breeding, Nest, Clutch Size, Fledge.

1. Introduction:-

The Palm Dove (*Streptopelia senegalensis*) is a common bird in the Sikar region. This small long-tailed dove is found in dry scrub and semi-desert habitats where pairs can often be seen feeding on the ground. It is resident and common breeder bird within the study area. The Indian population of Palm Dove *S. Senegalensis* prefer open land with scattering of trees and shrubs for cover and nesting. The back is uniform and dull brown in the Indian population. It is a common and widespread species in scrub, dry farmland and habitation over a good deal of its range. The species are mostly sedentary but some populations may make movements. The species is usually seen in pairs or small parties and only rarely in larger groups. Palm Doves eat the fallen seeds, mainly of grasses, other vegetable matter and small ground insects such as termites and beetles. They are fairly terrestrial, foraging on the ground in grasslands and cultivation. Breeding period was observed April to November in study area. Parasarya (1984), on *Nycticorax nycticorax*, Patel (1986) on *Columba livia*, Naik and Mistry (1975) on *Passer domesticus*, Mathew and Naik (1986) worked on *Passer domesticus* at tropical population. The present paper deals with various aspects of breeding performance of the Palm Dove (*Streptopelia senegalensis*).

2. Material and Methods:-

The Sikar region has a sub-tropical climate, which is exceptionally seasonal with a cold winter (November-February), hot summer (April-June) and warm rainy season (July-September). The scarcity of water and food, intense radiation, dry winds, strong sandy storms, wide diurnal and seasonal variation in the temperature and low humidity are the common characteristic features of the area. Regular weekly field trips were made throughout the period. Morning session of four hour duration (5-9 AM) and evening session of three hour duration (3:30-6:30 PM). I observed the Palm Dove during the breeding season using a photographic camera (Nikon SLR) and a 10 x 50 binocular (Nikon). About 504 hours were spent time to time in the study field and a total 24 Nests and 21 breeding pairs were recorded in two breeding season (2008 to 2009). During the observation the nests, other activities were also counted. Some nests were traced by following the bird while they carrying the food. The nests were checked every day during the laying period and four to five day intervals during the incubation and hatching periods. After hatching regular visit to be made for the check the hatched chicks, till they leave the nest. I observed that after 15 days the chicks were fledged from the nest. The young fledge and leave the nest after about 14 to 16 days (Manakadan et al. 1995 and George, M John 2000). The length and breadth of eggs were measured by the Varnier's Calipers. The Shape Index (SI) for eggs was calculated using given formula, $SI = (\text{Length} / \text{Breadth}) \times 100$.

3. Results and Discussion:-

During the study period of 21 months a total of 24 nests of *S. senegalensis* were studied. There were 21 nests found in active condition. From the distribution of the nests in different months it appears that the breeding season as well as peak periods of breeding of *S. sene-*

galensis at Sikar region varies from year to year (Table 2). In general the breeding season of *S. senegalensis* is March to October. The peak breeding period for *S. senegalensis* was noted during August and September 2008 and 2009. August and September month are more suitable for breeding for *S. senegalensis*. Newton (1964) reported that the year to year variation in the breeding season and peak of breeding.

4. Nesting Sites:-

Palm Dove mostly preferred the medium and small leafy, dense bushes and small leafy trees for nesting. In the study area *S. senegalensis* preferred as nesting plant species like as *Ziziphus jujuba* (Ber Jhari), *Acacia nilotica* (Kikar), *Morus alba* (Shahtoot), *Bauhinia racemose* (Jhinja), *Syzigium cumini* (Jamun), *Polyalthia longifolia* (Ashapala), *Temocella undulata* (Rohida), *Prosopis cineraria* (Khejri), *Quercus indica* (Sevra).

5. The Nest:-

Both sexes take part in the nest construction during the breeding season. *S. senegalensis* constructs the nest a sparse and carelessly made fabrication: a rough base, on top of which somewhat denser layers are added, made from finer, thinner materials and about 30 cm across, and is situated about 3 m from the ground. The male brings the materials and the female arranges them. The nest is completed within about two or three days. It prefers the material for built up the nest like thin and thick twigs. All bird builds their nests at different height of trees. Palm Dove generally selects 4.5 to 5.5 m. height for nest construction, but they do not prefer low height i.e. < 3.5 m (Table 3).

6. The Eggs:-

The colors of eggs are pinkish white with dark and light brown spots. The weight of one egg of two days old was 7.1 gm. Average length and breadths of eggs are $18.8 \text{ mm} \pm 0.5378$ and $14.6 \text{ mm} \pm 0.4373$ (n=73). Takagi (2003) stated that the natural selection should favour females that produce larger eggs. According to Horak et al. (1995) high investment into egg size might be in conflict with energetic demands of female and her willingness to produce more offspring. The mean egg shape does not differ significantly in different months (Patel 1986). Shape index is depended on weight. A positive correlation between egg size (weight or an index of volume derived from the length and breadth of eggs) and nesting survival, or growth, has been found for most bird species studied by Schiff ferli (1973). Reddy et al. (1979) observed that there was an adverse relation between decreased shape index and increasing egg weight.

7. Clutch Size:-

The clutch size means the number of eggs laid in series without any interruption. Normally the upper limit of the clutch size is two in *S. senegalensis*. 24 nests were found with 02 clutches (Table 5). Vijayan (1980) observed that the variation of the clutch size is correlated with the availability of food; the larger clutch is laid when the food for the

young is most abundant. According to Lack's hypothesis (Lack 1954) that the clutch is a hereditary characteristic of each species and has evolved through natural selection of correspond with larger number of young for which the parent can, on the average, provide enough food. Roff (1992) observed that the clutch size reduction under high risk of nest predation has been hypothesized to be adaptive for at least two reasons.

8. Incubation and Nestling Period:-

Incubation period is the interval between the laying the first egg and hatching of that egg within clutch. Skutch (1945) and Nice (1954) also it is considered and define incubation period from the laying of the last egg of a clutch to the hatching of the last nestling. The nestling period is defined as the interval of time the last chick of the brood remained in the nest. As per my observation the incubation period in *S. senegalensis* is 13 to 15 days. The young fledge and leave the nest after about 14 to 16 days. Ali and Ripley (1971) have also recorded the period of *P. cafer* as approximately 14 days and the nestling period is 12 days. Patel (1986) observed that the environmental temperature has some effects on the length of incubation period in *C. livia*. The nestling period probably depended upon the number of young in a brood, productivity of the habitat, nest height and age of parents (Dhanda and Dhindsa 1998). The best food source for the parents is one of the reasons for less required period than the other places. Patel (1986) reported that the length of incubation period is dependent upon the ambient air temperature and the nestling period upon the light hours.

9. Hatching, Fledgling and Breeding Success:-

The success of hatching is the proportion of eggs in a clutch that produce young ones. The hatching success is seen moderate during study period, because during the hatching period a single adult mostly found in the nest. Some time high wind velocity, heavy rainfall as well as predators were responsible for average hatching success. The success of fledgling depends on nestling deaths and predation. Heavy rainfall with high wind velocity and starvation are responsible for loss of fledgling success. Fledgling is the proportion of the chicks that fledge from a brood. Breeding success is defined as "When one or more young from a clutch of eggs survives to fledging are occurs". The breeding success of *S. senegalensis* in and around Sikar appeared to be exceptionally low for period of 21 months, of the 45 eggs laid by *S. senegalensis* but only 09 nestling were fledged. However, Ali (1930) was noted that out of six nests of *P. cafer* under his observation none produced a fledgling that flew. It might be depending on place, time, environmental conditions and parents care, etc. During my observation period vegetation looking good, but there are some ecological factors inhibits the breeding success. They are like heavy rainfall, high wind velocity, House Crow, Shikra, Black Kite, Indian Tree Pie, Squirrels, and Cats as predators. The breeding performance of *S. senegalensis* is poor (Table 6), but the hatching and fledging success is overall moderate. Breeding season is almost seen during monsoon but some nests were observed in summer season also. The nest places, nesting materials, and availability of food were looking good in the study areas, but environmental factors, predation and sometimes dearth of food etc. are responsible for lower breeding success of *S. senegalensis*. At present the population of *S. senegalensis* is well maintained in the study area because adults are well adapted with respective food and good vegetation. As per my knowledge by the human being provide the food and shelter for the birds purposefully and accidentally in the study area. So the population of birds is well maintained in the study area.

Acknowledgement:-

This paper is based on my field observations. This study would not have been possible without the financial co-operation of University Grant Commission, Bhopal. I am grateful to UGC, Bhopal for their financial assistance in the form of Minor Research Project.

Table 1: meteorological data.

Year	Maxi. Temp. (0C)	Mini. Temp. (0C)	Rainfall (in mm.)
2008	42	-4	312.46
2009	47	-1	125.10

Table 2: Nest distribution in percentage during breeding season.

Year	April	May	June	July	August	Sept.	Octo.	Nov.
2008	4.1 (1)	4.1 (1)	4.1 (1)	8.3 (2)	12.5 (3)	12.5 (3)	4.1 (1)	4.1 (1)
2009	4.1 (1)	4.1 (1)	4.1 (1)	8.3 (2)	8.3 (2)	8.3 (2)	4.1 (1)	4.1 (1)

Table 3: Vertical distribution of nests.

Height (in meter)	No. of nests	Distribution
2.0-2.5	0	0.0
2.5-3.0	0	0.0
3.0-3.5	2	8.3
3.5-4.0	2	8.3
4.0-4.5	6	25.0
4.5-5.0	10	41.6
5.0-5.5	4	16.6

Table 4: Length and breadth of eggs in *S. senegalensis*

No. of eggs	Mean length	Mean breadth
48	31.7 ± 5268	22.8 ± 4862

Table 5: Clutch size in *S. senegalensis*

Year	Clutches	No. of nests
2008	2	11
	1	1
2009	2	10
	1	2

Table 6: A summary of the breeding performance of *S. senegalensis*

Summary	Year		Average
	2008	2009	
Clutches	12	12	12
Total eggs laid	23	22	22.50
Hatched	13	11	12
% of hatched	56.52	50.00	53.26
% of hatching failure	4.34	4.54	4.44
% of egg loss	43.47	50.00	46.73
Fledged	5	4	6.50
% of fledged from hatched	38.46	36.36	37.41
% of fledged from total eggs laid	19.23	18.18	18.70

Author Profile (Corresponding Author)



Dr. Maha Singh Rao received the B.Sc. degree in Biology Stream in 1987 and M.Sc. degree in Zoology (Entomology) from Zoology Dept. University of Rajasthan, Jaipur (Rajasthan) in 1993 and Ph.D. degree in Dec. 2013 from MGS University, Bikaner (Rajasthan). Member of Bombay Natural History Society Mumbai. From 1999 to till today worked as Associate Professor of Zoology in Govt. S. K.

College, Sikar (Rajasthan).

Dr. Maha Singh Rao Lecturer in Zoology, Govt. S. K. PG College, Sikar (Rajasthan) India 332001
Mob. No. 09414332403 (Res.) = 01572-249300 Mail ID msingh4209@gmail.com Residence Address:- P.No. 30, Ramawat Nagar, Kissan Colony, Nawalgarh Road, Sikar (Rajasthan) India 332001

REFERENCES

- [1] Ali, S. (1930): Casualties among the eggs and young of small birds. *J. Bombay Nat. His. Sos.* 34: 1062-1067. | [2] Ali, S. and Ripley S. D. (1971): Handbook of the birds of India and Pakistan, Vol. 6. Oxford University Press, Bombay. | [3] Baker, E. C. Sturt (1932): The Nidification of birds of the Indian Empire, Vol. 1. Taylor & Francis, London. | [4] Dhanda, S. K. et al. (1998): Breeding ecology of Common Myna (*Acridotheres tristis*) with special reference to the effect of season and variable. *J. BNHS.* 95 (1): 43-56. | [5] Dixit, D. (1963): Notes on a case of Red-vented Bulbul (*P. cafer* L.) nesting indoors. *Pavo*, 1: 19-31. | [6] Dutt, N. B. (1932): Bulbul in Calcutta and its shrubs. *J. BNHS.* 35: 895-896. | [7] Horak, P. et al. (1995): Egg size in Great Tit (*Parus major*) individual, habitat and geographic differences. *Ornis Fennica*, 72: 97-114. | [8] Lamba, B. S. (1968): Wire notes of Red-vented Bulbul (*P. cafer* L.) *J. BNHS.* 68: 222 pp. | [9] Mathew, K. L. et al. (1986): Interrelation between moulting and breeding in a tropical population of the House Sparrow (*Passer domesticus*). *Ibis*, 128: 260-265. | [10] McCann, M. (1931): Notes on the nesting habits of the Red-vented Bulbul (*P. cafer* L.). *Ibis*, 35: 680-681. | [11] Naik, R. M. et al. (1980): Breeding season in a tropical population of the House Sparrow (*P. domesticus*). *J. BNHS.* 75: 1118-1142. | [12] Newton, I. (1964): The breeding biology of Chaf finch. *Bird Study*. 2: 47-68. | [13] Nice, M. M. (1954): The problems of incubation period in North American birds. *Condor*. 56: 173-197. | [14] Parasarya, B. M. (1984): "Studies on the coastal birds and their marine habitat, with special emphasis on the biology of the Indian Reef Heron". Ph. D. Thesis, Saurashtra Uni. Rajkot. | [15] Patel, M. I. (1986): "Ecological studies on the Feral Pigeon in a tropical urban area". Ph. D. Thesis, Saurashtra Uni. Rajkot. | [16] Prajapati, K. M. (2006): "Ecological Evaluation of avian diversity at emerging town Gandhinagar", Ph. D. Thesis, Hemchandracharya North Gujarat Uni. Patan. | [17] Reddy, P. M. et al. (1979): Egg weight, shape index and hatch ability in Khaki Campbell duck egg. *Ind. J. Poult. Sci.*, 14: 26-31. | [18] Roff, D. A. (1992): The evolution of life histories: theory and analysis. New York Chapman & Hall. Safriel, U. N. 1975. | [19] Schiff Ferli, L. (1973): The effect of egg weight on subsequent growth of nesting Great Tits (*Parus major*). *Ibis*. 115: 549-558. | [20] Skutch, A. F. (1945): Incubation and nesting period of Central American birds. *Auk*. 62: 8-37. | [21] Takagi, M. (2003): Seasonal change in egg volume variation within a clutch in the Bull-headed Shrike (*Lanius bucephalus*). *Canad. J. Zool.* 81: 287-293. | [22] Vijayan, V. S. (1980): Breeding biology of Bulbuls (*Pycnonotus cafer* and *Pycnonotus luteolus*) Class: Aves, Family: Pycnonotidae with special reference to their ecological isolation. *J. BNHS.* 75: 1090-1117. | TABLE 1: METEOROLOGICAL DATA. |