



Breeding biology of domestic pigeon (*Columba livia* Feral) from Village Chhajjian, Haripur Pakistan

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Abstract

Observations of individually marked pairs of brooders were conducted at the village where in about 10 houses were found to domesticate the feral pigeon were kept and breed. The total 170 nests were found during the study 101 of them were found to be active total number of the eggs observed in the nests were 200 eggs. 200 eggs were taken, the eggs width was found to be 202.8005 ± 0.6 , Egg length (mm) 3.9005 ± 0.03 , Egg weight (gm) 18.3 ± 0.02 . Egg length and width has no significant difference ($P > 0.05$). The incubation period was about 18 days and the chicks spent approximately four weeks in the nest before fledging. The highest number of fledglings observed in locality 4 where the % is 50.

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Introduction

Initially Pigeons were found wild in Mediterranean bordering countries, on cliffs and coasts of Europe, Western Asia and North Africa. In North later on they were introduced and colonized, all over Europe including Central and South America (Baptista *et al.*, 1997). In both temperate and tropical regions (Gompertz, 1957; Goodwin, 1960). They are now live mainly in urban environments and distributed worldwide (Haag-Wackernagel and Taube, 1998; Hatch, 2003). The species has a large range, with an estimated global occurrence of ten million km².

Feral Pigeon reproduces in all months of the year, even in winter (Johnston and Janiga, 1995). In spring and summer breeding activity is most intense, and in autumn and winter then it decreases markedly (Johnston and Janiga, 1995). During the period of gaining independence Survival can also be influenced by predation (Hetmański and Barkowska, 2008). food Access (Sol *et al.*, 2000), and characteristic habitat (Sales and Janssens, 2003; Kim *et al.*, 2008). During a season breeding strategy of the Feral Pigeon is based on having the greatest number of broods to produce many young (Hetmanski and Wolk, 2005). Laying small clutches and small eggs promoted by Several evolutionary strategies (Murakami *et al.*, 1994), after losing one quickly beginning of another brood (Johnston and Janiga, 1995), with highly nutritious pigeon-milk feeding of their offspring (Xie *et al.*, 2017), overlapping of clutches (Hetmanski and Wolk, 2005), and broods bi-parental care (Pimentel *et al.*, 2005). Pigeon breeds oftenly throughout the year Though, during winter, only a few pairs breed (Hetmański, 2004). In many urban areas they may cause problems but in In villages people kept them as their Hobby as in my house in village since from 1998 up to now date. survival rate of the Some bird fledglings depend upon predation (Sol *et al.*, 1998). But, we think that in Feral Pigeon it was not a significant factor because in the study area during the entire study period only irregular attacks on pigeons by cats *Felis catus* and *Helogale parvula*, eagels and also the pet dogs at night were observed but the householder than soon detected and shooted them to avoid the predation.

We also did not find any indication of going birds outside areas besides there keeping areas or present in wild condition (Ferman *et al.*, 2010).

No scientific work is done before in Pakistan so far, on the breeding biology of domestic pigeon, so it is a first kind of paper related to Breeding Biology of domestic pigeon in Pakistan. The aim of this research is to present Breeding timing and nest characteristics including, nest architecture, Clutch size and egg characteristics including egg dimensions (breadth, diameter, weight and egg shape index). Breeding success and failures in domestic pigeons also the timing of the beginning of the breeding period and of its final conclusion in specific pairs, to define the duration of the reproduction period in the population studied.

Material and method

Study area

The study was conducted in Chhajjian is a valley in Haripur District in Khyber Pakhtunkhwa province of Pakistan. It is located south East of the District Haripur at (33.88522°N 73.038054°E). It is surrounded by mountains, its mountains are covered with Pine trees and rich in wildlife. it is located far about 25 kilometre from the district Haripur, Rainfall is much higher than in most other parts of district Haripur.

Sampling

The duration of the study spanned 7 months, January to July 2018. Nests study begun at the start of the January. All the nests were found in the 5 houses of different localities in the village during that time. In this way 50, 30, 29, 21, 40 nests of domestic pigeons were found in different localities total of 170 nest were found during study period and later 101 nests become active and 69 nest were found to be in active. Birds of the different localities nested mainly on the floor close to the walls or some other object, built nests at different levels, especially in the upper parts of the structures, mostly in or on the wooden boxes on beams, on the roof construction. as in some houses the boxes were placed above the ground for pigeon keeping so a support of ladder was used for observing them some pigeon cages were placed on the roofs of the houses so they were easily visited and observed daily.

Photographs were taken Egg parameter egg length, egg breadth, and egg volume and egg shape index. Number of hatchling, fledgling, breeding success, reproductive success and fledgling/nest will also record. Egg achievement and nest achievement all the brooding pairs before investigation were marked and there boxes also labelled with numbers. Statistical analyses were performed by using One Way ANOVA and all the mean values are given with Standard Deviation (Mean±SD) Egg weight was taken on common weighing bar. Egg length and breadth was measured by Vernier Calliper with Least Count 0.5mm Egg volume was calculated from the length and breadth using them formula (Hoyt, 1979). $V=0.51 \times L \times B^2/1000$. Where V is volume in cm³, L is length and B is breadth in mm.

Results

Nest building and attachment of nest and number

All the nest of pigeon present in a house made up of wood and mud basically place for keeping the livestock buffalos and goats. Wooden cages are place there for them above from the ground the maximum number of pigeon were found in one house, 70 and they are domesticated there since from 1980s, having the different colours but mostly were found to be the white in colour and some are having the bright shiny greenish colour mostly in neck areas and sometimes grey by the whole body. Their number sometimes may reaches up to 100 due to breeding success but their number soon decline due to the predators attack by having in the open area like hawks, cats mostly eat the little babies and crows feed on their eggs and dogs catches the pigeons which are near to take their flight. And now a day's mongoose is the active predator of these pigeons. The number of nest made up of pine leaves also the feather of pigeons and sometime also by their dropping material and along with little soil were found to be 50 but besides them 20 are active and 30 nest were inactive were found in one hous. besides nest in the wooden boxes set for them some nest also found in the roof of that place of house made up of trees barks and soil. Nest demonstration is more frequent in the male than in the female at the beginning of the cycle.

In the female it occurs later, but reaches almost the same frequency as in the male. Nest are made up of leaves of pines and other grasses available to the pigeons at that are sometime The number of nest made up of pine leaves also the feather of pigeons and sometime also by their dropping material and along with little soil. Nest were builds by pigeons and besides in wooden boxes attached to the above from the ground and below from the roof some nest were also observed in the wooden roof of that place. They set in the boxes in the form of pair's one male and one female.

Table 1. Total number of the nest observed in different localities for domesticated pigeons.

Total nest	Active nest	Inactive nest
50	49	11
29	22	7
30	19	11
21	14	7
40	29	11

Nest organization and nest size

The nest of pigeons made up of the dry pine leaves as a major constituent because they are used by the house keepers for the purpose of fire also contain the feather of pigeons and the chamber is lined with the other grasses.

Breeding time Period

The pigeons bred throughout the year, Pairs of young birds started nesting 2–3 months later than adult birds. The average length of a pair's breeding season was 183 days. Nibbling occurs only in the female at the beginning of the cycle, but later on it is also shown by the male. Pushing, which is also shown mainly by the female, is most frequent during the days immediately prior to egg-laying. At this time the collecting of nest material also reaches its peak. This behaviour is more frequent in the male than in the female. The actions that compose the courtship pattern seem The first of these is the primarily aggressive behaviour, represented by bowing, attack intention and attacking. 34 minutes of daily contact between male and female during a period of 12 to 15 days was sufficient to produce broodiness and egg-laying.

Clutch Size

Clutch size referred to the number of eggs laid by female in the nest clutch size of the pigeons ranges 1-2 eggs usually 2 eggs. Sometimes 3 eggs also observed in the nests. The eggs are cream to pinkish white colour. The total 170 nests were found during the study 101 of them were found to be active total number of the eggs observed in the nests were 200 eggs.



Fig. 1. Eggs of domestic pigeon, fledglings.

Table 2. Total number of the clutch size, egg and hatchlings observed in different localities for domesticated pigeons.

Number of nest	Clutch size	Eggs	Hatchlings	Percentage of Fledglings
50	2	20	9	45
29	2	15	5	34
30	2-3	20	6	30
21	2	13	7	54
40	2	29	10	34

Eggs traits

200 eggs were taken, the eggs width was found to be 202.8005±0.6, Egg length (mm) 3.9005±0.03, Egg weight (gm) 18.3±0.02. Egg length and width has no significant difference (P> 0.05).

Table 3. In egg traits mean and standard deviation observed in different localities for domesticated pigeons.

Egg traits	Mean ± SD	N
Egg width (mm)	202.8005±0.6	200
Egg length (mm)	3.9005±0.03	200
Egg weight(gm)	18.3±0.02	200

Reproductive achievement, Reproductive failure, Hatchling failure

The incubation period was about 18 days and the chicks spent approximately four weeks in the nest before fledging. Fledglings spent another week in the nest before foraging with the adults. It is also observed during the study that the one egg hatched earlier than another.

Young birds often lose when competing with adults for food, this being the main cause of their mortality during the period of achieving independence another cause of death of young's is predation they can easily attack on young once. The highest number of fledglings observed in locality 4 where the % is 50.

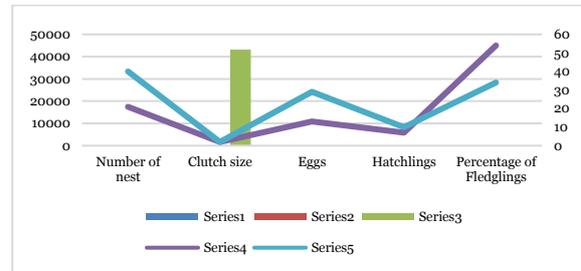


Fig. 2. Number of nests, Average number of clutch size, eggs, Hatchlings.

Discussion

Our study shows that the total 170 nests were found during the study 101 of them were found to be active total number of the eggs observed in the nests were 200 eggs. 200 eggs were taken, the eggs width was found to be 202.8005±0.6, Egg length (mm) 3.9005±0.03, Egg weight (gm) 18.3±0.02. Egg length and width has no significant difference (P> 0.05). The research of (Hetmanski and Barkowska, 2007) show that nesting conditions in a pair's territory play a significant role in hatching and fledging success, and also indirectly impact the number of fledglings. The incubation period was about 18 days and the chicks spent approximately four weeks in the nest before fledging. The highest number of fledglings observed in locality 4 where the % is 50. In general, the results supported (Lack, 1968), hypothesis that "clutch-size corresponds to the brood size from which the parents can, on average, raise most young, the limit being set by the amount of food which they can collect for them." three-egg clutches which were only slightly less successful than broods of two. However, their scarcity suggested strong selection against them. Main cause was found for their mortality was the predator attack. In general the pigeon house keeping is a fascinating and charming thing by controlling the predators we can increase the number of pigeons, and also by improving their nesting condition and their food status.

Conclusions

We concluded that the studying breeding biology we can improve the status of feral pigeon at domestic level and we enhance their number for the economic purposes.

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References

- Baptista L, Trail P, Horblit H.** 1997. Family Columbidae (pigeons and doves). Handbook of the birds of the world **4**, 60-243.
- Ferman L, Peter H, Montalti D.** 2010. A study of feral pigeon *Columba livia* var. in urban and suburban areas in the city of Jena, Germany. Arxius de Miscellània Zoològica **8**, 1-8.
- Gompertz T.** 1957. Some Observations on the Feral Pigeon in London (With Addendum: Two cases of polyneuritis in Feral Pigeons. Derek Goodwin). Bird Study **4(1)**, 2-13.
- Goodwin D.** 1960. Comparative ecology of pigeons in inner London. British Birds **53(5)**, 201-212.
- Haag-Wackernagel D, Taube D.** 1998. Vom heiligen Vogel der Liebesgöttin zur Strassentaube. Verlag Schwabe & Co. AG, Basel.
- Hatch SA.** 2003. Statistical power for detecting trends with applications to seabird monitoring. Biological Conservation **111(3)**, 317-329.
- Hetmański T.** 2004. Timing of breeding in the Feral Pigeon *Columba livia* F. domestica in Słupsk (NW Poland). Acta Ornithologica **39(2)**, 105-110.
- Hetmanski T, Barkowska M.** 2007. Density and age of breeding pairs influence feral pigeon, *Columba livia* reproduction. Folia Zoologica **56(1)**, 71.
- Hetmański T, Barkowska M.** 2008. Breeding parameters and recruitment in feral pigeons *Columba livia* F. domestica. Acta ornithologica, **43(2)**, 159-166.
- Hetmanski T, Wolk E.** 2005. The effect of environmental factors and nesting conditions on clutch overlap in the feral pigeon *Columba livia* F. urbana (Gm.). Polish Journal of Ecology **53(4)**, 523-534.
- Johnston RF, Janiga M.** 1995. Feral pigeons, Oxford University Press on Demand.
- Kim LM, King DJ, Guzman H, Tesh RB, da Rosa APT, Bueno R, Dennett JA, Afonso CL.** 2008. Biological and phylogenetic characterization of pigeon paramyxovirus serotype 1 circulating in wild North American pigeons and doves. Journal of clinical microbiology **46(10)**, 3303-3310.
- Lack DL.** 1968. Ecological adaptations for breeding in birds.
- Murakami N, Nakamura H, Nishi R, Marumoto N, Nasu T.** 1994. Comparison of circadian oscillation of melatonin release in pineal cells of house sparrow, pigeon and Japanese quail, using cell perfusion systems. Brain research **651(1-2)**, 209-214.
- Pimentel D, Zuniga R, Morrison D.** 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. Ecological economics **52(3)**, 273-288.
- Sales J, Janssens G.** 2003. Nutrition of the domestic pigeon (*Columba livia domestica*). World's poultry science journal **59(2)**, 221-232.
- Sol D, Jovani R, Torres J.** 2000. Geographical variation in blood parasites in feral pigeons: The role of vectors. Ecography **23(3)**, 307-314.
- Sol D, Santos DM, Garcia J, Cuadrado M.** 1998. Competition for food in urban pigeons: The cost of being juvenile. Condor **298-304**.
- Xie P, Wang XP, Bu Z, Zou XT.** 2017. Differential expression of fatty acid transporters and fatty acid synthesis-related genes in crop tissues of male and female pigeons (*Columba livia domestica*) during incubation and chick rearing. British poultry science **58(5)**, 594-602.