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Evaluation of the Productive and Reproductive Performance of Pigeon in Selected Districts of Bangladesh

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1. Abstract

The experiment was conducted to determine the productive and reproductive performance of pigeon which are available in the northern Bangladesh. During this study 45 farms were selected which have >20 pair of pigeon for commercial and >10 pair pigeon for traditional farm in the three-study area namely Rajshahi, Natore and Pabna district of Bangladesh. The data were collected from different farm within the study area through a questionnaire and interview schedule with the farm owner's Reproductive performance determined by the observation of age of sexual maturity, age of first laying, incubation period, hatchability (%), no. of clutch, interclutch period and fledgling period. Productive performance determined by the observation of-no. of egg per year and no. of squab per year. The average body weight of pigeon 519.22±15.26, age of sexual maturity 177±2, number of eggs 2.00, incubation period 17.60±0.04, hatchability 80.63±0.31, laying interval 16.22±0.15, squab production per year 7.87±0.08 and average productive life 8.29±0.09. The reproductive and productive performance of pigeon are better in Rajshahi district than other two districts. During study period body weight (gm) recorded maximum 1012.17±143.51 in rain breed, minimum 274.17±29.34 in helmet. Age of sexual maturity (days) maximum 226±26 in rain and less time required 138±20 day in nun breed. Hatchability (%) maximum 90.00±3.54 in gola breed and minimum 76.43±4.97 in pouter. Laying Interval (days) maximum 22.44±3.81 in gola and minimum 13.11±0.93 in nun. Squab production (per year) maximum 9.22±0.83 in nun and minimum 6.33±0.65 in rain. Productive live (year) maximum 10.11±1.62 in nun and minimum 6.54±0.57 in pouter breed. In case of number of egg production there is no statistically significant difference among the breed of pigeon. The experiment's result may contribute to breed up gradation, helps as genetic resource and also helps to formulate the conservation and improvement strategies for the breed of pigeon.

2. Introduction

Productivity of pigeon is of most importance in commercial pigeon keeping wherein the profit increases with raise in the reproductive potentialities of pigeons. Nutritional components in the feed and supplements have immense potentials to increase the growth and reproductive rates of birds and to increase the innate immunity of individuals. Pigeon, common name for members of the large family Columbidae, land birds, cosmopolitan in temperate and tropical regions, characterized by stout bodies, short necks, small heads, and thick, heavy plumage [1]. Pigeons are incredibly complex and intelligent animals. Pigeons (Order Columbiformes) are ubiquitous birds and can be found in virtually every town and city around the globe [2]. They are highly dependent on humans to provide them with food and sites for roosting, loafing, and nesting. Domestic pigeons attain the right stage of sexual maturity to begin their first reproductive cycle in 6 or 7 months (Kazal Krishna Ghosh, 2013). The breeding season of Columba livia is long and lasting all

year round, but reproductive peaks occur during the spring and summer [3]. According to Abed Al-Azeem, egg cycle of healthy pigeons is within the range of 45¾ -54½ days [4]. They live side by side with human as a source of food, hobby and experimental purposes (Sari et al. 2008). Although pigeons are one of the most intelligent of all the bird species man has found limited uses for the birds other than for the purposes of sport, food and as a message carrier. Bangladesh has a long historical record of raising poultry under backyard system [5]. The weather and vast areas of crop field along with housing premises of Bangladesh are suitable for pigeon farming [6]. M bap (1985) suggested that before attempting any genetic improvement, animals must first be characterized [7]. The future utilization of genetic resource depends on breed characterization [8]. Present status of a livestock breed in terms of breed characteristics is essential to formulate the conservation and improvement strategies for the breed.

Pigeons are mainly monogamous birds [9]. Courtship display of pigeon is usually performed by the male, and shown by the fluffing of the breast feathers, dragging of the tail, cooing, and treading of the feet on the floor. If the female is receptive, she will nod her head, after which billing follows. The male presents an open beak into which the female inserts hers. There is evidence that the male regurgitates into the beak of the female. Subsequently the female will crouch, elevate her wings and receive the male, and the pair-bond is formed [10, 11, 1]. It is well to mention at this juncture that in about 8-12 days after mating, the female pigeon usually lays two eggs one-by-one in consecutive days to produce young squabs. Indeed a few attempts have been made to hand-feeding squabs but not always from the day of hatching [12-14]. Both parents fed the young ones with their crop milk up to 10 days before the squabs are getting ready to feed independently. Although meat from squabs is produced commercially, information regarding breeding techniques and advances is lacking [15]. The present investigation was carried out to evaluate the reproductive and productive performance of pigeons by analyzing their reproductive characteristics and productive performance for a period of three consecutive years.

3. Material and Methods

3.1. Selection of Pigeon

At least 15 pigeon farms were selected from each district and each district should be consist 10 commercial and 5 traditional farms. A total at least 7409 pigeons (>20 pair in fancy and >5 pair backyard) have been selected for the study. The selected pigeon was classified according to their genetic composition. The breed of pigeon were indigenous, cross and high yielding verities. The pigeon was also grouping on the basis of size (small, medium and heavy), rearing purpose (Meat or fancy or duel), sex (male or female), age (squab, Juvenile and adult). The management of pigeon viz. housing, feed habit and feeding, breeding, watering, hygienic management, vaccination and deworming programmed was observed. The housing was classified according to their housing pattern, hosing system, housing condition, housing environment etc. The feed of pigeon was grouping on the basis on quality and quantity. The vaccination and deworming programme was observed.

3.2. Determinant of The Productive and Reproductive Performance of Pigeon

With a view to fulfillment of the objectives of this study related data were recorded such as breed, age, sex, age of sexual maturity, number of clutches, inter clutch period, hatchability, number of squab productions per year, productive life and body weight.

3.3. Data Collection

The data were collected from the selected pigeon farm through a questionnaire and by interview schedule directly from the farm owners.

3.4. Statistical Analysis

Analysis of data by some computer packages like SPSS version, 21 and compared using Analysis of variance (ANOVA) by Duncan Multiple Range Test (DMRT). Data were presented as Mean ± SE. $P<0.05$ was considered as significant.

4. Results

The research works revealed that the breed characteristics have influence on reproductive and productive performance in pigeon. A total of 268 pair of pigeon were examined for this experiment among them Nun breed which requires less time to reach at sexual maturity (138±20 days), Laying Interval (13.11±0.93 days), highest squab production (9.22±0.83 per year) and highest productive live (10.11±1.62 year). On the other hand, highest body weight possesses Rain breed (1012.17±143.51gms) and lowest in Helmet breed (274.17±29.34gms), highest time required to reach at sexual maturity in King breed. Highest hatchability (%) were recorded in Gola breed and lowest in Pouter. In the meantime, Gola pigeon takes more time in laying interval. Lowest squab production and productive live were found in Rain breed (6.33±0.65 per year) and in Pouter pigeon (6.54±0.57 year) respectively. Interestingly there is no significant difference in the number of egg production and incubation period among the selected breed of pigeon in the study areas.

5. Discussions

The results of present study stated that maximum body weight found in Rain breed (1012.17±143.51gms) and minimum in Helmet breed (274.17±29.34gms). Table -1 Shows that heavy weight pigeon requires more time to reach sexual maturity than medium and light weight pigeon. Darwati et al. (2010) recorded the average of egg production was 1.8 eggs/pair/period, fertility was 96.6%,

hatching rate was 77% in local pigeon but highest hatchability (%) 90.00±3.54 in local pigeon Gola breed found and there is no significant difference in egg production among breed of pigeon in present experiment. In this study revealed that 80.63±4.03% hatchability in owl breed on the other hand in a similar study Danuta Majewska et al. (2016), found 97.2% hatchability in Polish owl breed. Kazal Krishna Ghosh et al. (2013), was observed that the age of maturity, incubation period and productive life were ranging from 6-7 months, 18-21 days and 6-9 years respectively. The production of squabs was ranging from 5-12 pair per year. In average age of sexual maturity, incubation period and productive life were 177±34(days), 17.60±0.59(days) and 8.29±1.50(year) respectively and the average production of squabs 7.87±1.39 per year (Table -1) recorded during study period in selected areas. Production of squabs on average by a pair of breeder pigeons was 7.87±1.39 per year which is lower the findings as reported by Levi [16]. He reported that a pair of breeder pigeon could produce 18- 20 squabs per year. This might be due to less knowledge about disease management and predatory attack in the study areas. [6] also found 19.53 production of squab/year/pair of pigeon in Gouiripur upazilla of Mymensingh district., Hatching period, fledgling period and interclutch period of Jalali pigeon were 18.00±0.09, 35.80±0.22 and 32.33±0.66 days, respectively was stated in a similar research work of Bhowmik [5]. In the traditional system of pigeon growing, Levi [17] observed that pigeons more often than not lay 1-3 eggs / brood, but two eggs per pair/ brood is very common and in case of egg production of pigeon among breed similar results found in the present research.

Table 1: Effect of Breed on reproductive and productive performance in pigeon

Breed (pair)	Body weight (gm)	Age of sexual Maturity (days)	No of egg	Incubation period (days)	Hatchability (%)	Laying Interval (days)	Squab production (per year)	Productive live (year)
King, n=9	**955.33±69.59^{ab}**	**219±21^{a}**	2.0±0.00	17.67±0.71	**80.56±3.00^{ab}**	**16.89±1.27^{b}**	**6.56±0.53**	**6.72±0.71^{c}**
Bokora, n=14	**600.93±83.31^{c}**	**189±10^{ab}**	2.00±0.00	17.57±0.51	**79.29±4.32^{ab}**	**16.43±1.28^{b}**	**7.86±1.03^{b}**	**7.57±1.30^{bc}**
Nun, n=9	**292.44±46.24^{f}**	**138±20**	2.00±0.00	17.11±0.33	**83.33±2.50^{a}**	**13.11±0.93^{d}**	**9.22±0.83^{a}**	**10.11±1.62^{a}**
Pouter, n=14	**890.14±58.82^{b}**	**221±23^{a}**	2.00±0.00	18.07±0.83	**76.43±4.97^{c}**	**16.64±0.93^{b}**	**6.71±1.20^{c}**	**6.54±0.57^{c}**
Short face n=14	**288.21±53.27^{f}**	**148±13^{c}**	2.00±0.00	17.43±0.51	**84.64±3.08^{a}**	**14.29±0.61^{c}**	**9.36±0.74^{a}**	**9.04±1.25^{ab}**
Arch angle n= 11	**315.64±36.13^{c}**	**162±19^{b}**	2.00±0.00	17.55±0.52	**80.91±3.75^{ab}**	**14.36±0.81^{c}**	**8.82±0.87^{ab}**	**9.09±0.94^{ab}**
Cormona n=8	**286.50±29.01^{f}**	**147±19^{c}**	2.00±0.00	17.63±0.52	**81.25±2.31^{ab}**	**14.13±1.46^{c}**	**8.63±1.30^{ab}**	**8.75±1.16^{b}**
Lakka n=19	**402.79±68.88^{d}**	**161±20^{ab}**	2.00±0.00	17.42±0.61	**79.63±6.57^{ab}**	**15.42±1.30^{bc}**	**8.26±1.45^{ab}**	**8.84±1.01^{b}**
Homer n= 14	**691.64±56.30^{c}**	**183±54.46^{c}**	2.00±0.00	17.50±0.52	**77.50±4.27^{c}**	**16.86±0.95^{b}**	**6.93±0.62**	**6.96±0.60**
Helmet n=12	**274.17±29.34^{f}**	**153±11^{b}**	2.00±0.00	17.58±0.51	**82.50±2.61^{a}**	**14.33±1.07^{c}**	**9.08±1.24^{a}**	**9.13±0.61^{ab}**
Owl n=16	**414.25±231.66^{d}**	**160±34^{b}**	2.00±0.00	17.69±0.60	**80.63±4.03^{ab}**	**15.19±1.83^{bc}**	**8.63±1.36^{ab}**	**8.50±1.46^{b}**
Strasser n=10	**810.20±283.02^{b}**	**206±27^{ab}**	2.00±0.00	17.80±0.63	**77.00±3.50^{c}**	**16.50±1.51^{b}**	**6.80±1.23^{c}**	**7.30±1.62^{bc}**
Frillback n=12	**689.83±48.48^{bc}**	**201±13^{ab}**	2.00±0.00	17.67±0.49	**77.92±4.50^{c}**	**16.58±1.16^{b}**	**6.92±1.08^{c}**	**7.79±1.37^{bc}**
Magpie n=7	**378.57±74.70^{de}**	**165±13^{c}**	2.00±0.00	17.71±0.49	**80.71±5.35^{ab}**	**15.14±0.90^{bc}**	**8.86±0.69^{ab}**	**8.36±1.44^{b}**
Jacobin n=14	**373.36±53.44^{de}**	**172±22^{b}**	2.00±0.00	17.57±0.51	**80.71±3.31^{ab}**	**15.43±1.40^{bc}**	**7.79±1.05^{b}**	**9.82±1.27^{ab}**
Mookee n=15	**329.73±42.12^{de}**	**151±19^{b}**	2.00±0.00	17.27±0.46	**80.80±3.21^{ab}**	**14.33±0.98^{c}**	**8.67±0.90^{ab}**	**9.00±1.51^{ab}**
Maltese n=12	**641.83±56.90^{c}**	**197±19^{ab}**	2.00±0.00	17.75±0.62	**80.42±4.50^{ab}**	**16.67±1.07^{b}**	**6.83±0.72^{c}**	**7.58±1.56^{bc}**
Rain n=12	**1012.17±143.51^{a}**	**226±26^{a}**	2.00±0.00	18.25±0.45	**77.92±3.34^{c}**	**16.83±0.72^{b}**	**6.33±0.65^{c}**	**6.75±1.27**
Oriental fild n=6	**687.00±55.55^{c}**	**198±17^{ab}**	2.00±0.00	17.50±0.55	**76.67±4.08^{c}**	**16.17±0.41^{b}**	**7.00±0.89^{b}**	**8.33±1.51^{b}**
Shallow n=11	**679.91±44.36^{c}**	**190±14^{ab}**	2.00±0.00	17.73±0.79	**78.64±2.34^{c}**	**16.82±1.08^{b}**	**7.55±1.13^{b}**	**8.32±1.01^{b}**

Giribag n=10	**327.10±59.25^{dc}**	**156±12^{b}**	2.00±0.00	17.60±0.52	**85.50±6.43^{a}**	**20.90±2.51^{a}**	**8.50±1.51^{ab}**	**9.10±0.88^{ab}**
Gola n=9	**334.33±65.55^{dc}**	**167±14^{b}**	2.00±0.00	17.33±0.50	**90.00±3.54^{a}**	**22.44±3.81^{a}**	**7.56±1.24^{b}**	**8.33±1.00^{b}**
Gobindo n=10	**306.00±53.84^{c}**	**159±24^{b}**	2.00±0.00	17.40±0.52	**85.00±4.71^{a}**	**20.40±2.99**	**7.60±1.35^{b}**	**8.90±0.88^{b}**
Total n=268	**519.22±249.89**	**177±34**	2.00±0.00	17.60±0.59	**80.63±5.01^{ab}**	**16.22±2.50**	**7.87±1.39**	**8.29±1.50^{b}**

In the value ± means standard error, abcdef means superscript are statistically significant $p<0.05$) in between the column.

6. Conclusions

The present research activities revealed that heavy weight pigeon require more time to reach sexual maturity than medium and light weight pigeon. Hatchability percentage is highest in indigenous or local pigeon than exotic or fancy pigeon in the study areas. I think this is the first research work in the selected areas of Bangladesh and it helps future study on reproductive and productive performance of pigeon in Bangladesh. Further study is necessary for better productivity and breed upgradation of pigeon.

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